

Nera C Service Manual

INMARSAT-C MOBILE EARTH STATION



Check List.....	1
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Chapter 1. General

1.1 General.....	1-1
1.2 Configuration	1-2
1.3 Connection	1-3
1.3.1 Antenna and terminal unit	1-3
1.3.2 [Junction] port	1-3
1.3.3 [LAN] port.....	1-5
1.3.4 [DTE] port	1-5
1.3.5 [D-GPS] port	1-5

Chapter 2. Block Description

2.1 Configuration.....	2-1
2.1.1 Nera C.....	2-1
2.1.2 Boards in each unit	2-2
2.2 Antenna unit, IC-115	2-4
2.2.1 ANT RF board (16P0207)	2-4
2.2.2 Antenna element	2-5
2.3 Terminal unit, IC-215	2-6
2.3.1 RF CON/CPU board (16P0208A)	2-7
2.3.2 TERM CPU board (16P0209)	2-19
2.3.3 Memory contents	2-26
2.3.4 PWR board (16P0211).....	2-29

Chapter 3. Location of Parts

3.1 Terminal unit, IC-215	3-1
3.2 Antenna unit, IC-115	3-8
3.3 Distress alert received unit, IC-305 and ALARM unit, IC-306.....	3-10
3.4 Junction Box, IC-315 (Option)	3-12

Chapter 4. Set up

4.1 System menu (F8).....	4-1
4.1.1 Setting by DTE port.....	4-1
4.1.2 System menu (F8).....	4-2
1. Distress Alert Setup: [F8]-1.....	4-2
2. System Setup: [F8]-2.....	4-2
3. Editor Setup (Close the TEXT editor display.) : [F8]-3.....	4-4
4. Terminal Setup: [F8]-4.....	4-5
5. EGC Setup: [F8]-5.....	4-5
6. Auto Mode Setup: [F8]-6.....	4-5
7. Email Setup: [F8]-7.....	4-6
8. Directories: [F8]-8.....	4-6
9. Configuration: [F8]-9.....	4-7
4.2 Setting from Command Window.....	4-8
4.2.1 Remote Box Setup.....	4-8
4.2.2 Setting of Internal GPS transmitting cycle.....	4-9
4.3 Jumper setting of IC-305 and 306.....	4-11
4.4 PR-240 power alteration.....	4-12

Chapter 5. Maintenance

5.1 PV (Performance Verification) test.....	5-1
5.1.1 PV test sequence.....	5-1
5.1.2 Procedure.....	5-2
5.2 Self test.....	5-5
5.2.1 Self test when the system is turned on.....	5-5
5.2.2 Self test from function menu.....	5-5
5.2.3 TROUBLE message.....	5-6
5.3 Status monitor.....	5-8
5.3.1 Items on the status monitor.....	5-8
5.3.2 NG analysis.....	5-11
5.4 Checking BPSK waveform.....	5-13
5.5 LED.....	5-14
5.5.1 IC-215.....	5-14
5.5.2 IC-305, 306.....	5-16
5.6 DIP switch and Reset switch on IC-215.....	5-17

5.7 Checking LES Information.....	5-18
5.8 Changing Back-up battery on TERM CPU board	5-20
5.9 Clearing Memory.....	5-21
5.10 Distress alert test.....	5-22
5.11 Saving and loading of system setting.....	5-24

Chapter 6. Updating program

6.1 Updating program.....	6-1
6.1.1 Checking program version.....	6-1
6.1.2 Procedure	6-2
6.2 Program files.....	6-3
6.3 Installing Terminal software to PC	6-3

Chapter 7. Messages

7.1 Status display.....	7-1
7.1.1 Display of bottom left	7-1
7.1.2 Display of bottom center.....	7-4
7.1.3 Display of bottom right.....	7-5
7.1.4 Display of upper part.....	7-6
7.1.5 Display of status display part	7-7
7.2 Messages for Operation	7-8
7.2.1 Messages for [F1], File menu	7-8
7.2.2 Messages for [F3], Transmit menu	7-8
7.2.3 Messages for [F5]-1, Data Report menu.....	7-9
7.2.4 Messages for [F7]-6-1, PV test	7-9
7.2.5 Messages for Printer (Output from TERM CPU).....	7-9
7.3 Cautions and information message.....	7-10

Appendix 1) Inmarsat system.....	AP1-1
AP1.1 System Overview	AP1-1
AP1.1.1 System Configuration	AP1-1
AP1.1.2 Inmarsat C Services	AP1-3
AP1.1.3 Destination Type	AP1-4
AP1.1.4 Charging	AP1-6
AP1.1.5 Network	AP1-7
AP1.1.6 Frequency assignment.....	AP1-9
AP1.2 Message & Signal Transfer	AP1-10
AP1.2.1 Ship- originated Call	AP1-10
AP1.2.2 Shore- originated Call	AP1-12
AP1.2.3 Log in/Log out	AP1-15
AP1.2.4 Distress Alert	AP1-16
AP1.3 Channel types and Signal processing.....	AP1-17
AP1.3.1 Channel types	AP1-17
1. NCS CC/LES TDM Channel	AP1-18
2. Signaling Channel	AP1-19
3. MES Message Channel	AP1-21
AP1.3.2 Signal Processing.....	AP1-22
1. Signal processing Flow for Each Channel.....	AP1-22
 Appendix 2) Menu Tree.....	 AP2-1
AP2.1 Menu Tree.....	AP2-1
 Appendix 3) Coast station service list.....	 AP3-1
AP3.1 Inmarsat C coast station service list	AP3-1
 Appendix 4) E-mail.....	 AP4-1
AP4.1 Features.....	AP4-1
AP4.2 Limitations	AP4-2
AP4.3 Precautions	AP4-2
AP4.4 Network Setup menu	AP4-3
AP4.5 Setting LES	AP4-5
AP4.6 Setting Active Port.....	AP4-7
AP4.7 Message Log	AP4-8

AP4.8 Connection and setting.....	AP4-9
AP4.8.1 Connection to single PC	AP4-9
AP4.8.2 Connection of multiple PCs.....	AP4-11
AP4.8.3 Connection to multiple networks.....	AP4-12
AP4.9 Function settings	AP4-14
AP4.9.1 DHCP.....	AP4-14
AP4.9.2 SMTP Enable IP Address	AP4-15
AP4.9.3 Mail Gateway.....	AP4-16
AP4.9.4 Selective forwarding.....	AP4-18
AP4.9.5 Message size	AP4-20
AP4.9.6 Attachment conversion	AP4-21
AP4.10 E-mail Client Setup (Outlook Express Ver.6).....	AP4-22
AP4.11 Windows XP LAN setting	AP4-29
AP4.12 Connection check.....	AP4-32
AP4.12.1 Checking by Ping command	AP4-32
AP4.12.2 SMTP error message list.....	AP4-33
AP4.13 US ASCII code list.....	AP4-34

<i>Appendix 5) Specifications.....</i>	<i>AP5-1</i>
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<i>Exploded View.....</i>	<i>D-1</i>
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<i>Electrical Parts List.....</i>	<i>E-1</i>
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<i>Schematic Diagrams</i>	<i>S-1</i>
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- Check for waterproofing of the antenna.
- The receiving signal from selected satellite is not obstructed by other objects, such as a crane. See AP1-2 for the satellite antenna direction.

1. Installation

The table 1 lists check items of the installation.

Table 1. Items to be checked of installation

No.	Item to be checked		Result	Reference to
1	Power supply cable	The current of the power supply cable, such as for the back up battery, is 5 to 7 A when transmitting.		
2	Antenna cable	<ul style="list-style-type: none"> - The designated cable is used. 30m: TP5FBAW-5DFBB 50m: 8D-FB-CV 100m: 12D-SFA-CV - The antenna cable is waterproofed. 		
3	Other cable	Check for connection of the IC-305.		
		Check for connection of the IC-306.		
4	Grounding	IC-115: Antenna unit		
		IC-215: Terminal unit		
		PR-240: Power supply unit		
5	PR-240 specification	<ul style="list-style-type: none"> - 220 VAC - The power is supplied from both the main source and the emergency source. 		4-12
6	Connector	The antenna connector is connected securely.		
7	Indication : IMN, AAB, CS, etc	The indication is sealed around the terminal unit.		

2. Program version

See chapter 6.

The program version is checked by “Diagnostic Test” (keystroke: [F7]-7-3).

For the detail version, type “Nera” while pressing [Ctrl].

Table2. Program version

Program	Detail version	
TERM CPU	1650162-01.xx	Ver
RF CON/CPU	1650159-01.xx	Ver

3. Settings

Table 3 lists check items for the setting.

Table 3. Items to be set

No.	Items to be set		Result	Reference to
1	DMC-5	[F8]-2: Command Window "Remote Box Setup"		4-8
2	IC-305	[F8]-2: Command Window "Remote Box Setup"		4-8
3	IC-306	[F8]-2: Command Window "Remote Box Setup"		4-8
		IC-306 jumper setting		4-11
4	Distress Alert setup	[F8]-1: Distress Alert setup		4-2
5	System setup ([F8]-2)	System Date & Time Date: ZDA Time: TDM frame data		4-2 to 4-4
		IMN Re-enter: Type "IMN" while holding [Ctrl].		
		MES Operation Mode INMARSAT C EGC		
		NAV Port OFF INT: Internal GPS (Option) EXT: External GPS		
		Active Port INT ALL		
		Message Output Port INT EXT INT+EXT AUTO		
		EGC Output Port INT INT+EXT		
		Network - IP Address - Subnet mask - DHCP(ON/OFF) - Gateway		
		Mail Gateway - Attach(UUENCODE/BINARY) - Delivery To(PC Mailer/Server) - Server IP - Address Mode(FIXED/AUTO) - Mail Address - Auto Delivery keyword		

4. Checking

Table 4 is the check list for items to be set.

Table 4. Check list for items to be set

No.	Items to be checked		Result	Reference to
1	IC-306	When [ALARM RESET] is pressed, the buzzer and LED is an active.		
2	IC-305	[F7]-7-4: Distress Alert Button Test		5-22
3	DMC-5	[F7]-7-4: Distress Alert Button Test ** DMC setting should be set to "SES(EGC)" only. If it is set to VHF and MF/HF, the distress alert is released from VHF and MF/HF device. **		5-22
4	Error/Trouble message	The message does not appear.		5-6 Chapter7
5	Diagnostics Test	All Diagnostic Test ([F7]-7-3) is OK.		5-5
6	Status	Position		5-8 4-3
		Course/Speed (Displaying VTG data)		2-15
		Current NCS The receivable ocean region is set.		5-8
		Antenna Power Supply		5-11
		BBER: OK		5-11
		C/N (The value is stable.) 31 to 34 dB and above: OK		5-11 5-13
		Rx AGC Level: OK		5-11
		REF Offset Freq.: OK		5-12
		Synthe Local: OK		5-12
		Send Level Normally, "0" for receiving, "255" for transmitting		5-11
7	FDD	[F1]: Read/Write		
8	Printer (PP-510)	Prints correctly. - When turning on the unit while holding [LF]: All character is printed. - When turning on the unit while holding [NLQ]:The printer setting value is printed.		

5. Communication test

Before the test, check followings.

- 1) C/N of the status display is OK.
- 2) Its value is stable.
- 3) "Current Status" is "Idle".

5.1 Log in

When Log in ([F7]-1) is succeeded, "Successful Login" appears.

If the trouble message appears, see the list below.

Table 5. TROUBLE message

TROUBLE message	Description	Remedy
ANT Power voltage abnormality	The supplied voltage error for the antenna unit	- Change IC-115 or PWR board. - Check the antenna cable.
1. Too many retries. 2. MES Signalling Failure, Login Request not sent to NCS. 3. Login failed. 4. Carrier power level	1-3. Login failed 4. The transmit level is not within the rating. (actuality, no appears)	- Change IC-115 or RF CON/CPU. - Check the antenna cable.

5.2 PV test

PV test is started by [F7]-7-1. OK When "Overall Result" is "Pass". See page 5-1.

The PV test result ([F7]-7-2) should be printed out.

PV Test Result	

Ctrl + P : Print ESC : Quit	

Test Date & Time	02-01-01 01:00 (UTC)

Attempts	First attempt
BBER	Pass
Shore - to - Ship Attempts	First attempt
Ship - to - Shore Attempts	First attempt
Distress Alert	Pass (Test OK)
Signal strength	Pass (Greater than Std level + 6dB)

Overall Result	Pass (Applicable tests pass)

5.3 Loop back test

Start Loop back test which the message is send back to the own ship. The transmitting and receiving message should be printed out.

- 1) Make a test message by “New” ([F1]-1).
- 2) Set following items by “Transmit Message” ([F3]-1).
 - Priority : Normal
 - Destination Type : TELEX
 - Country/Ocean Code: The Ocean region to be selected
POR: 582, IOR: 583, AOR-W: 584, AOR-E: 581
 - Station ID : To enter the own IMN
 - LES ID : LES
 - Option
 - Confirmation : ON
 - Send Delay : 00:00
 - Delivery Dela : Immediate
 - Code : IA5
- 3) Move the cursor onto “Transmit” and press [Enter].
- 4) Select “YES” and press [Enter] to start the transmission.
- 5) When the same message is received after 5 to10 minutes, the test result is OK. If the message cannot received correctly, confirm “Delivery” in “Send Message Log” ([F6]-1). See page 7.

5.4 EGC receiving

The alarm is checked by following the message priority.

The alarm is sounded from IC-305 and the Terminal unit by DIS/URG Message.

See page 2-17. The EGC receiving message should be printed out. See page 4-6.

6. Delivering

Before delivering, the following instruction is needed.

- 1) How to release the distress alert, use distress communication, cancel the false distress alert* and stop the alarm.
- 2) How to register the “station list”.
- 3) How to “log in/log out”.
- 4) How to communicate by using “E-Mail and FAX”.
- 5) How to confirm the “delivery status”.
- 6) How to save and load the system setting value, such as the station list. See page 5-24.
- 7) Necessary items to be reported for inquiry when the trouble occurs.
 - Error in detail, frequency, symptom
 - Condition after changing the Ocean region and LES
 - Following condition in status monitor;
 - current NCS, own ship position, C/N, BBER, Rx AGC Level, REF Offset Freq, Synthe Local, Antenna Power Supply,
 - Error message, Information message

*: Canceling the distress alert

To cancel the distress alert, report by the priority message (Priority: Distress) to proper RCC via LES which is used to transmit the distress alert.

Example;

NAME, CALLSIGN, ID NUMBER, POSITION
 Cancel my INMARSAT-C distress
 Alert of DATE, TIME UTC.
 =Master+

7. Clearing memory

When the trouble occurs, clear the memory before changing the board or the units.

To clear the memory, turn on the unit while pressing [DEL]. The clearing is finished when buzzer is sounded three times. See page 5-21.

Non-delivery Notification Failure Codes

ABS	Absent subscriber. The mobile terminal is not logged-in to the ocean region.
ACB	Access barred.
ADR	Addressee refuses to accept message.
ANU	Deleted. The message has not been delivered within an hour and is therefore deleted.
ATD	Attempting to deliver the message.
BK	Message aborted. Is used when a fax or PSTN-connection is cleared abnormally.
BUS	Busy.
CCD	Call cut or disconnected.
CI	Conversation impossible.
CIE	The CES ran out of processing/communications capacity to process your message.
CNS	Call not started.
DTE	Data terminal equipment. Used when an X.25 subscriber has cleared the connection during the call attempt.
ERR	Error.
FAU	Faulty.
FMT	Format error.
FSA	Fast select acceptance not subscribed.
IAB	Invalid answerback from destination.
IAM	Was unable to process the address information in the following message:
IDS	Invalid data from ship.
IDT	Input data timeout
IFR	Invalid facility request.
IMS	Message size is invalid, 7932 characters maximum.
IND	Incompatible destination.
INH	Was unable to establish the type of message from following header:
INV	Invalid.
ISR	Invalid ship request.
LDE	Maximum acceptable message length or duration has been exceeded.
LEF	Local equipment failure.
LPE	Local procedure error.
MBB	Message broken by higher priority.
MCC	Message channel congestion.
MCF	Message channel failure.
MKO	Message killed by operator.
MSO	Machine switched off.
NA	Correspondence with this subscriber is not admitted.
NAL	No address line is present.
NC	No circuits.
NCH	Subscriber's number has been changed.
NDA	There was no delivery attempt.
NFA	No final answerback.
NIA	No initial answerback.
NOB	Not obtainable.
NOC	No connection.
NP	No party. The called party is not, or is no longer, a subscriber.

NTC	Network congestion.
OAB	Operator aborted.
OCC	Subscriber is occupied.
OOO	Out of order.
PAD	Packet assembler/disassembler.
PRC	Premature clearing.
PRF	Protocol failure.
RCA	Reverse changing acceptance not subscribed.
REF	There was a failure in the remote equipment.
RLE	Resource limit exceeded.
RPE	Remote procedure error.
RPO	RPOA out of order.
SCC	Call completed successfully.
SHE	MES hardware error.
SNF	The satellite network has failed.
SPE	MES protocol error.
SUC	Test results being delivered.
TBY	Trunks busy.
TGR	TDM group reset.
TIM	Timeout.
TMD	Too many destinations.
UNK	Unknown. Is used when no other failure code are suitable.
WFA	Wrong final answerback.
WIA	Wrong initial answerback.

Chapter 1. General

1.1 General

Nera C is a successor of "Nera C12". Nera C is a communication system of Class 2 Inmarsat C which is smaller and lighter than "Nera C12". The operation is the same as "Nera C12".

Nera C has 10BASE-T port to communicate by E-mail from PC connected to LAN. The power supply is DC +12 V to 24 V.

Class 1: Inmarsat C communication only. Cannot receive EGC message.

Class 2: During Inmarsat C communication, cannot receive EGC message.

Class 3: Installed two individual receivers. During Inmarsat C communication, EGC message can be received.

Table 1.1.1 Nera C12 and Nera C

	Nera C12	Nera C
Power supply	DC 24 V 174 W or less (Including printer)	DC 12 V to 24 V 160 W or less (Including printer)
Antenna unit	195φx266H 3 kg	126φx155H 1.4 kg
Communication unit	72Hx230Wx271D 4 kg	Built-in type of TLX terminal and communication unit Color LCD: 270Hx320Wx112D 4.5 kg
Terminal unit	Monochrome LCD: 250Hx300Wx165D 6 kg	
Printer	PP-510	PP-510
Distress alert button	Connecting 2 sets	Built-in type of Distress alert button. Connecting Distress alert Received unit and 2 sets of ALAM unit. (Max. 3 sets)
Incoming Indicator	Up to 2 set connectable	
EXT DTE port	2nd DTE, PC (Not used)	PC
D-GPS port	No	Yes
Built-in GPS	Yes (GN-78, option)	Yes (GN-79, option)
LAN	No	Yes (10BASE-T)

1.2 Configuration

To use the cable other than TP5FBAW-5DFBB, optional N-TNC converting cable is needed to both the antenna unit and the terminal unit.

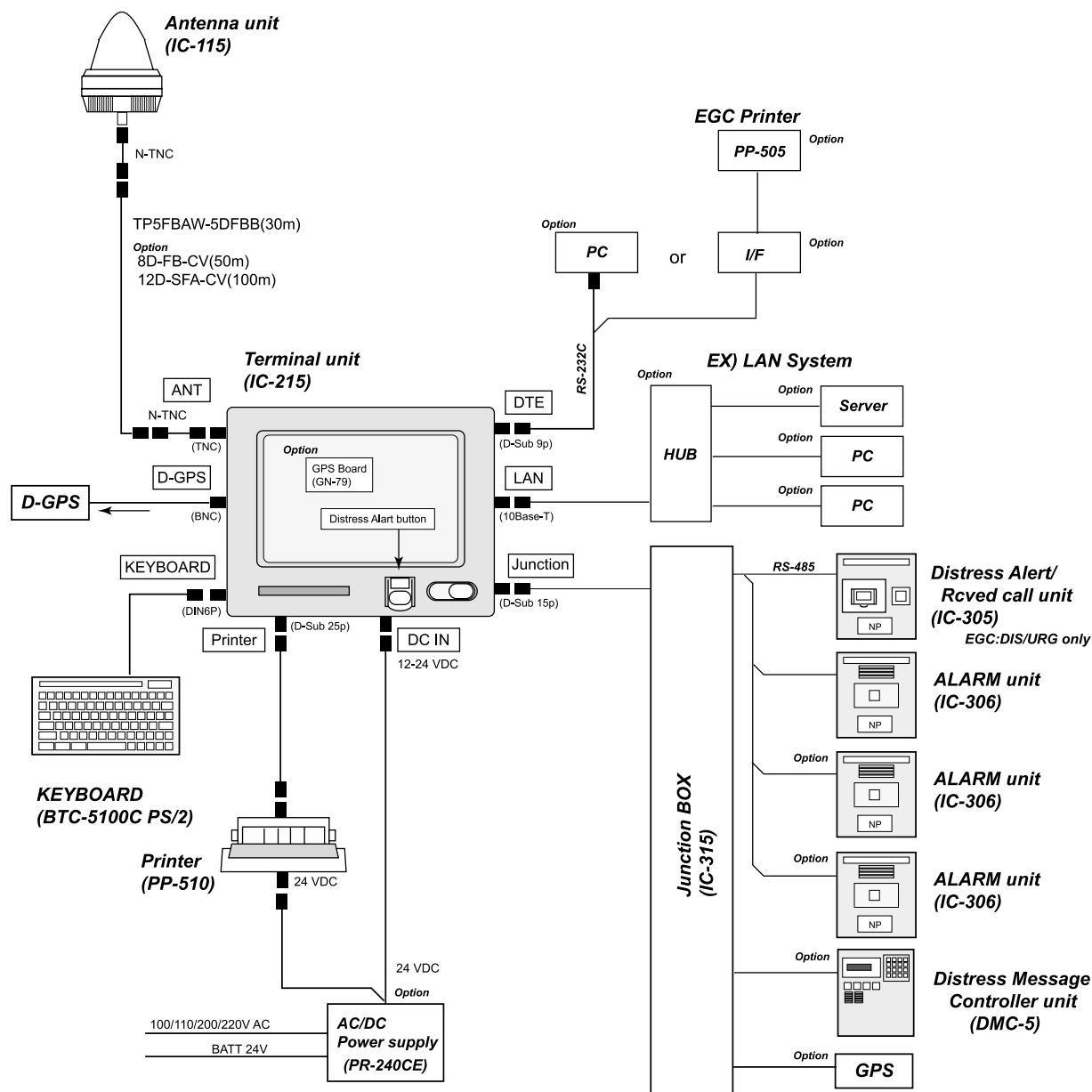


Fig.1.2.1 Nera C system configuration

1.3 Connection

1.3.1 Antenna and terminal unit

The antenna unit, IC-115 and terminal unit, IC-215 are connected by the coaxial cable. This coaxial cable includes 1530.0 MHz to 1545.0 MHz receiving RF signal, 1626.5 MHz to 1646.5 MHz transmitting RF signal, 1575.42 MHz receiving GPS RF signal and the power supplied to the antenna unit. The transmitting voltage is +29 V DC and the receiving voltage +7 V DC.

The loss of the coaxial cable is about 10 dB at 1.6 GHz.

To use the cable other than TP5FBAW-5DFBB, optional N-TNC converting cable is needed to both the antenna unit and the terminal unit.

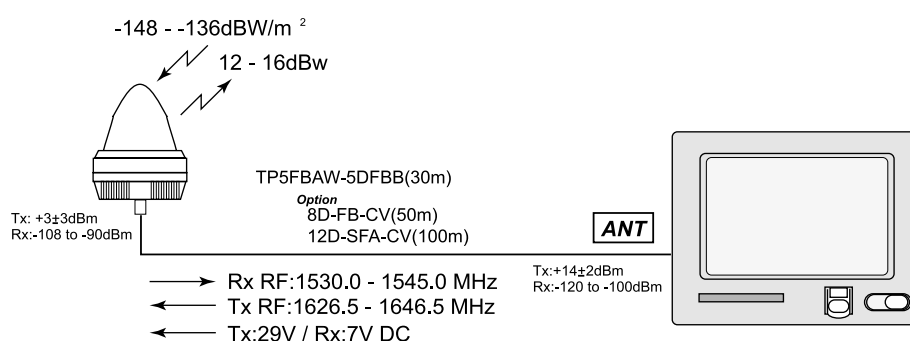


Fig.1.3.1 Connection of antenna unit and terminal unit

1.3.2 [Junction] port

[Junction] port is connected to the junction box (IC-315).

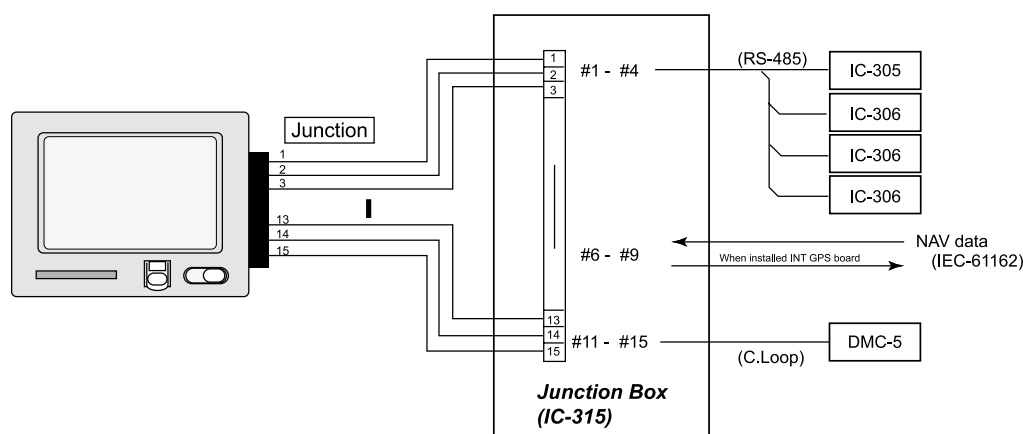


Fig.1.3.2 Connecting to Junction Box

1) Connecting the distress alert received unit and ALAM unit

The distress alert received unit: IC-305 and up to 3 ALARM units: IC-306 are connected to port #1 to #4 in parallel. The electrical rating of port #3 and #4 (TD/RD-A/B) connecting line is RS-485. Each unit needs to be set for identification such as DIS, RCV-1, 2 and 3. And IC-305 and IC-306 are controlled by the setting of “Command Window” in [F8]-2: system menu. Terminal unit communicated to these units recognizes each unit by this setting.

2) Connecting NAV data (IEC-61162)

Ports #6 and #7 (TD-A/B) are used for transmitting NAV data. To transmit NAV data, optional GPS receiving board (GN-79) is needed.

Ports #8 and #9 (RD-A/B) are used for receiving NAV data. The external GPS data needs to be connected.

3) Connecting DMC-5

Ports #11 to #15 are DMC-5 connecting terminals. The electrical rating is C. Loop.

DMC-5 is controlled by the setting of “Command Window” in [F8]-2: system menu.

Note) RS-485

This is like RS-422 (balanced). It is half-duplex, and not just point-to-point but like Ethernet since all devices (nodes) on it share the same “bus”. The driver output signal level (loaded minimum) is +/-1.5 V.

1.3.3 [LAN] port

10Base-T, RJ-45 connector is used for Ethernet LAN. Terminal unit includes the mail gateway function such as SMTP and POP3 so that the E-mail communication is available from the PC connected to LAN by using Inmarsat C.

Up to 32 k bite data is sent from the Inmarsat C.

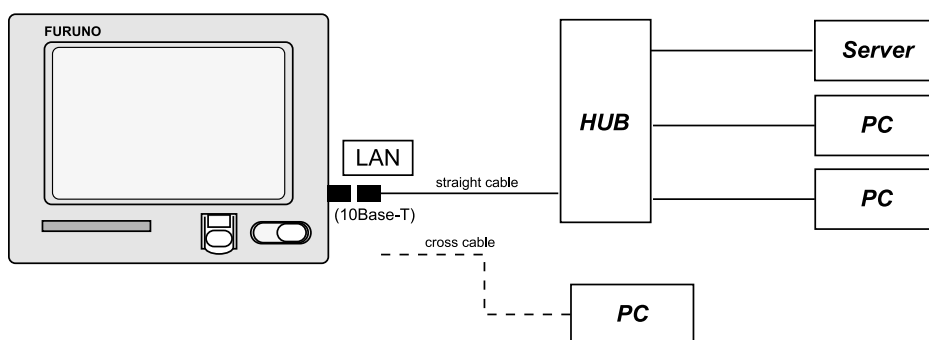


Fig.1.3.3 LAN system

1.3.4 [DTE] port

The specification of the input/output signal is RS-232C. Data communication is available by connecting PC. When installing another terminal unit(PC), it should be connected to [DTE] port by using the straight cable.

Commercial printer for Windows and PP-510 can be connected to “Printer” port on PC. Printer setting is made through “Printer setting” menu ([F1]-8).

With the commercial printer, error messages, such as “WARNING, TROUBLE: XXX” are not printed out.

1.3.5 [D-GPS] port

The receiving signal, 1530 MHz to 1545 MHz is output at the level of 50Ω, -103 dBm to -86 dBm.

Chapter 2. Block Description

2.1 Configuration

2.1.1 Nera C

Fig.2.1.1 shows the block diagram of the terminal unit, Nera C.

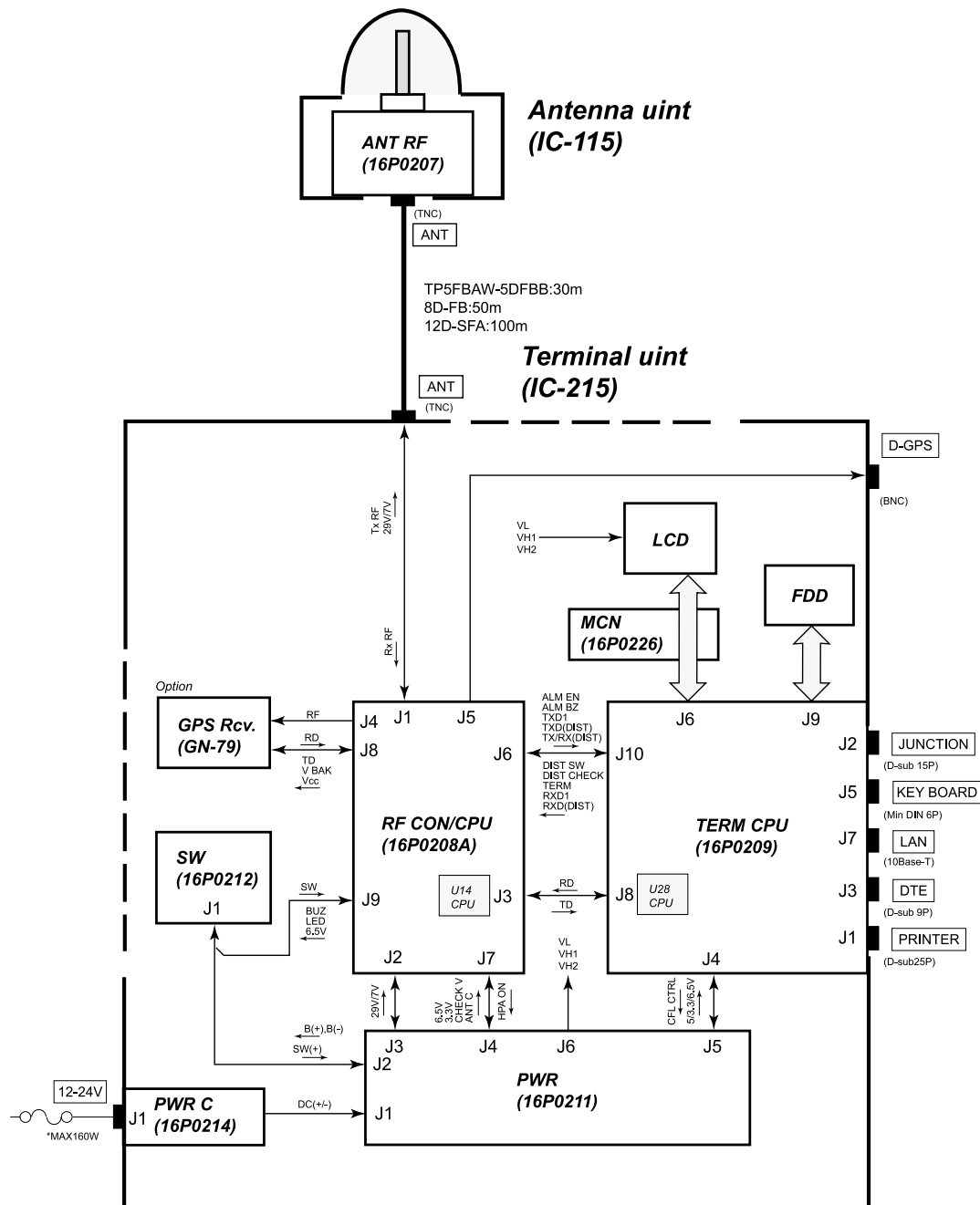


Fig.2.1.1 Block diagram of terminal unit, Nera C

2.1.2 Boards in each unit

Table 2.1.1 lists the function of boards in each unit.

Table 2.1.1 Boards in each unit

Unit	Board	Function	Remarks
Antenna (IC-115)	ANT RF (16P0207)	1) Consisting of RF amplifier circuit and the dielectric filter which dividing TX/RX signal. 2) Changing TX and RX circuit by antenna supplied voltage, TX 29 V/RX 7 V. 3) Automatically the transmission is stopped when the temperature of the board is over +95 °C. - Receiving gain: 36 dB \pm 3 dB NF=2.0 dB max. (Output: -108 to -90 dBm) - Transmitting gain: Outputs +42dBm by inputting +3 \pm 3 dBm - Continuous-time of transmitting: 8 minutes	The difference from Nera C12. 1) The diplexer is changed to the dielectric filter. 2) The circulator is not installed. 3) TX/RX voltage is changed from +29/18 V to +29/7 V. 4) The continuous-time of transmitting is limited.
	Daisy loop type antenna	Directional characteristics Horizontal: Non-directivity Vertical: EL=90°: 0 dBi and more EL= 5°: +1.3 dBi and more Polarization Right circular polarization wave	
Terminal unit (IC-215)	RF CON/CPU (16P0208A)	RX: Changing RF signal, -120 dB to -100 dBm from antenna unit to I signal and Q signal of the base band. After decoding, the signal is sent Term CPU board. TX: After encoding the data from Term CPU board, the data is modulated at DDS and changed to TX RF signal, +14 dBm. Oscillation circuit: The following frequencies are oscillated at DDS and PLL synthesizer circuit. TX=1626.5 MHz to 1646.5 MHz RX=1530 MHz to 1545 MHz EEPROM(U15): Memorizing FW/RT ID, DNID and ENID. See page 2-27.	When replacing RF CON/CPU board, remove the EEPROM(U15) from old board and put it on the new board.

Terminal unit (IC-215)	TERM/CPU (16P0209)	Communicating with followings; LCD, Printer, PC, Distress Alert Received unit, ALERT unit, NAV data, Ethernet, FDD, keyboard and RF-CON/CPU board.	I/F rating - Printer: Centronics - PC: RS-232C - Distress Alert Received/ ALERT unit : RS-485 - NAV data inputting: GGA, GLL, WPL, VTG, RMA, RMB, RMC, MTW, DBT, VDR, BWC, BWR and ZDA
	PWR (16P0211)	Switching power supply Input voltage: 10.8 V to 31.2 V Maximum input current: 13 A (When inputting 10.8 V) Output voltage: 29, 7, 6.5, 3.3, 5 V and LCD power supply Detecting status monitor signal: - CHECK V: Antenna Power supply - ANT C: Send Level Changing ANT TX/RX power supply by HPA ON signal	
	SW (16P0212)	Consisting of the distress alert button, the buzzer and the power switch.	
	PWR C (16P0214)	Consisting of the bypass capacitor for EMC and the power reverse connection protector diode.	
	GPS Receiver (GN-79)	12 CH parallel GPS receiver. Outputs GLL, GGA, VTG, RMC, GSV and ZDA by IEC-61162 data.	Option
	MCN (16P0226)	Relay board for wiring between Term CPU board and LCD.	
	FDD	FDD for 2HD and 2DD FD	
	LCD	640x480 dots and 262,144 color display. (In specification, IC-215 display uses 16 colors.)	
Junction box (IC-315)		Junction box for [JUNCTION] port of terminal unit. Terminal board only.	Option
Distress Alert Received unit and ALERT unit (IC-305/ 306)	DIST (16P0213A) RCV (16P0213B)	Consisting of I/F and the driver which communicates with Term CPU board by RS-485 signal conductor. Communication contents: The control of the buzzer and the button and the recognition of the unit number.	IC-305 and IC-306 have the same board. Maximum of 3 IC-306 unit and IC-305 unit are connected in parallel. The setting of the unit recognition number is necessary.

2.2 Antenna unit, IC-115

The antenna unit consists of ANT RF board (16P0207), ANT B(16P0206) and the daisy loop type antenna element.

2.2.1 ANT RF board (16P0207)

ANT RF board consists of the transmitting RF amplifier circuit, the receiving RF amplifier circuit, the voltage changing circuit of TX/RX circuit and the heat protecting circuit. The band pass filter is installed at the input/output unit of RF circuit to divide RF signal. Fig.2.2.1 shows the block diagram of the ANT RF board.

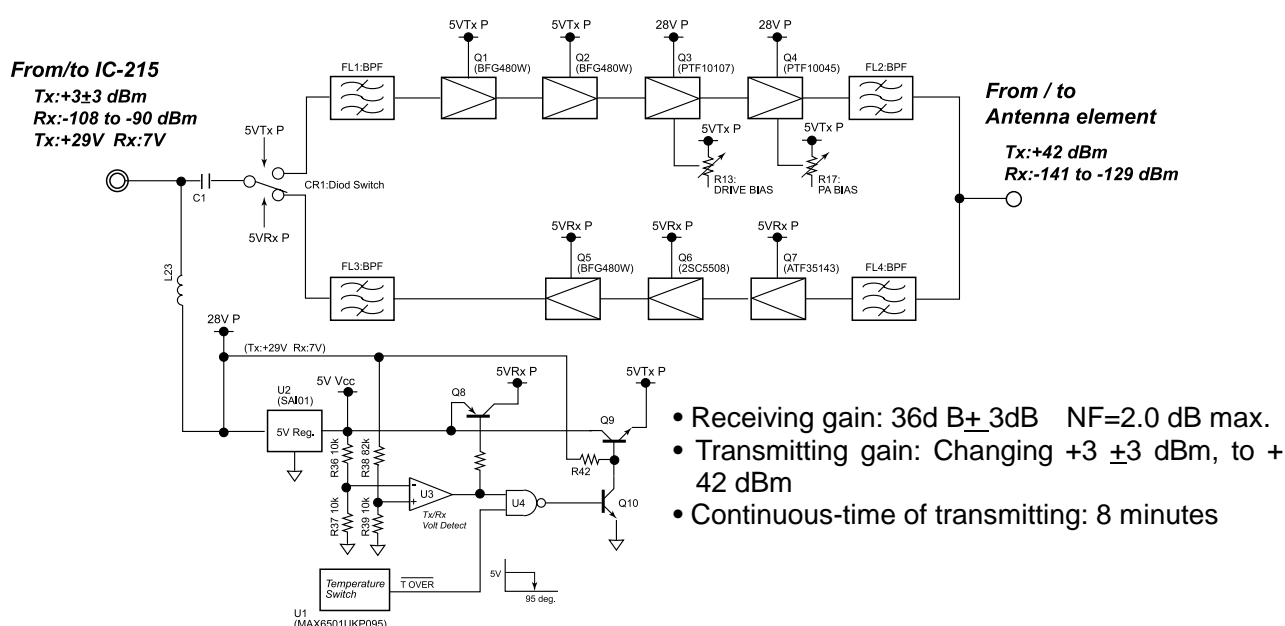


Fig.2.2.1 Block diagram of ANT RF board

To control the voltage changing of TX/RX circuit, the voltage, 29 V (TX)/7 V (RX) supplied from the terminal unit is detected by the comparator, U3. The output controls Q8 and Q9 to generate the voltage of 5 V RX P and 5 V TX P.

The heat protector is installed to stop the transmission automatically when the temperature of the board is more than +95 °C. To detect the heat of the board, the heat detecting switch, U1 is installed on the center of the ANT RF board. When detecting +95 °C, 5VTx P is set to OFF via NAND, U4 to stop the transmission.

2.2.2 Antenna element

Antenna unit consists of the element, the 3 dB hybrid and the reflector.

The antenna unit is called “DAISY LOOP ANT antenna”. ANT RF output, 42 dBm of 1.6 GHz is radiated from the antenna by 14 dBW of EIRP. The receiving signal of the power flux density, -148 dBW/m^2 to -136 dBW/m^2 of 1.5 GHz is input to ANT RF receiving circuit with the level of -141 dBm to -129 dBm .

- TX/RX antenna gain: more than 1.3 dBi
(When the antenna elevation angle is $+5^\circ$.)
- Directional characteristics
Horizontal: Non-directivity
Vertical:
 $1.3 \sin$ to $1.5 \sin$ (EI - 5) dBi
 $(+5^\circ < \text{EI} < +90^\circ)$
 $-2.7 \cos + 4 \cos [4.5 (\cos - 5)]$ dBi
 $(-15^\circ < \text{EI} < +5^\circ)$
- Polarization:
Right circular polarization wave

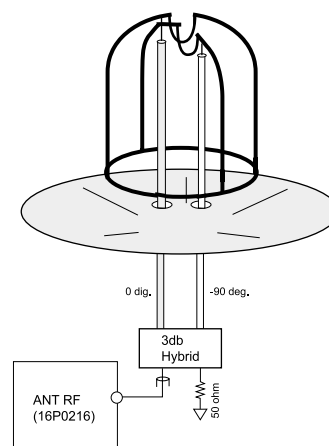


Fig.2.2.2 Antenna element

Fig.2.2.3 shows the vertical directivity diagram at 1.5GHz band.
(Horizontal Directivity: Non-directivity)

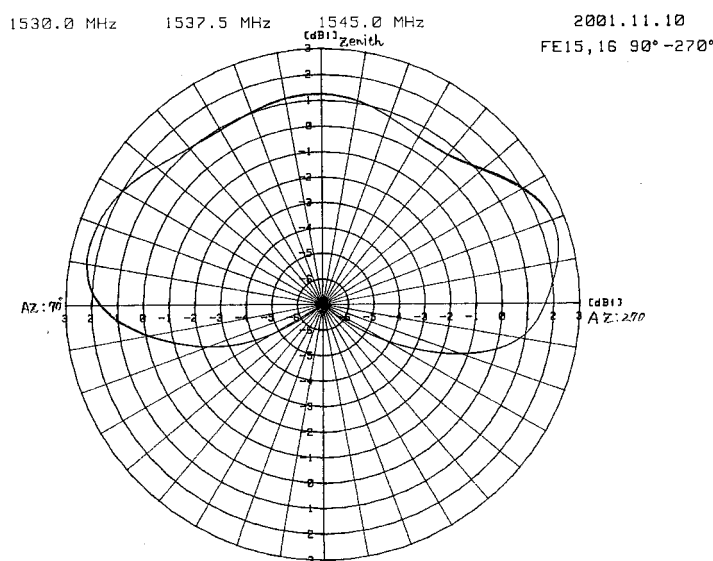


Fig. 2.2.3 Vertical directivity diagram

2.3 Terminal unit, IC-215

The terminal unit consists of PWR board (16P0211), RF CON/CPU board (16P0208A) and TERM CPU board (16P0209).

RF CON/CPU board and TERM CPU board are communicated by RS-232C.

The transmitting control unit such as Nera C 10/11/12 has the function of RF CON/CPU board, and the terminal unit such as IC-511/IB-581 has the function of TERM CPU board.

Fig.2.3.1 shows the configuration of the terminal unit.

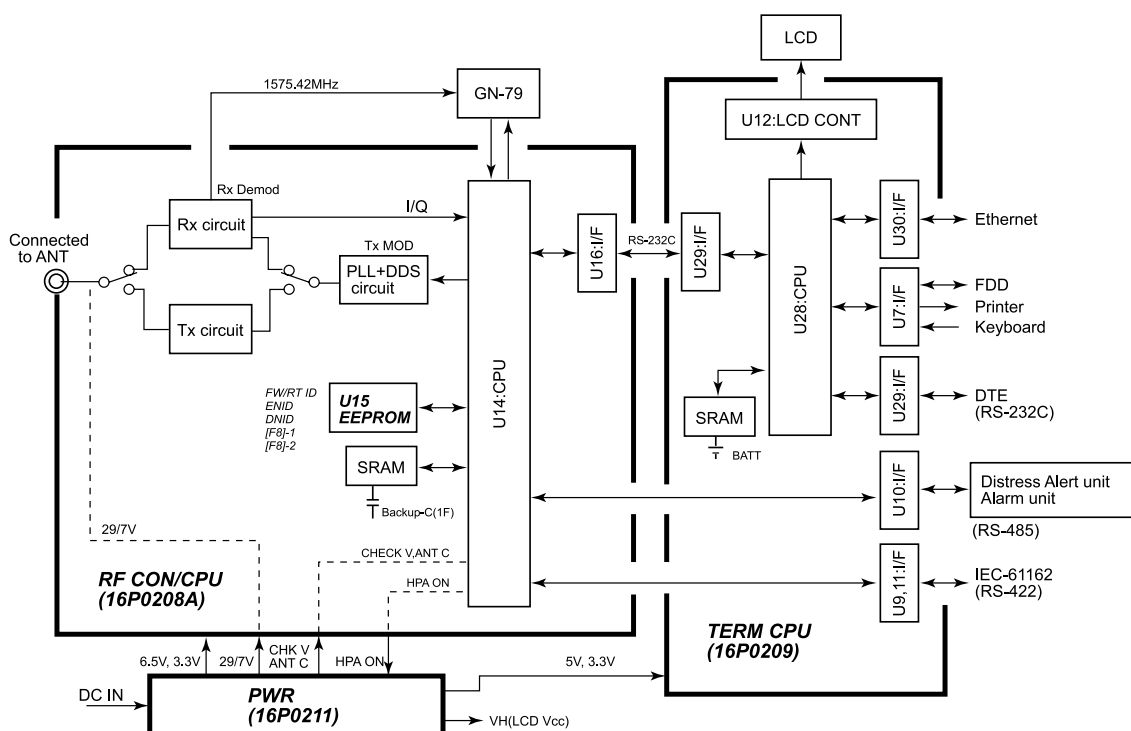


Fig.2.3.1 Configuration of Terminal unit

Note) When changing RF CON/CPU board, use EEPROM, U15 which memorizes the ID (Forward/Retune ID) for communication, the ENID (Fleet Net ID) for receiving EGC Fleet Net broadcasting, DNID (Data Network ID) for the data reporting service.

2.3.1 RF CON/CPU board (16P0208A)

The following describes the function of RF CON/CPU board.

Analog part

- Dividing the received RF signal to [D-GPS] terminal for D-GPS decoder.
- Dividing the received RF signal to GPS receiving board (GN-79, option).
- Changing the received RF signal to the IF signal: 1.2 kHz.
- Generating the 400 kHz TX/RX frequencies at PLL synthesizer circuit. (TX: 1626.5 MHz to 1646.5 MHz Rx: 1530.0 MHz to 1545 MHz)
- BPSK modulating at DDS.

Fig.2.3.2 shows the synchronizing detection circuit.

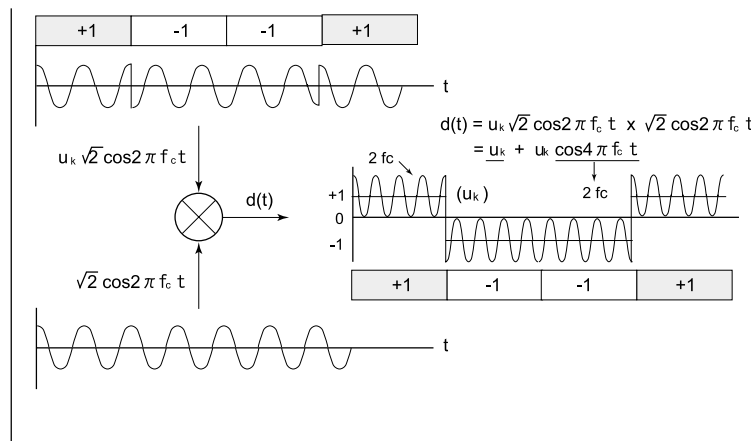


Fig.2.3.2 Synchronizing detection circuit

CPU

- Controlling communication protocol of Inmarsat C.
- TX/RX signal processing
- TX/RX changing
- Controlling AGC, PLL and DDS circuit
- Communicating with TERM CPU
- Controlling the Distress Alert Received unit(IC-305) and the Alarm unit(IC-306)
- Handling IEC-61162 (NMEA) data
- Monitoring SYN, CHECK V (the supplied voltage for the antenna) and ANT C (Antenna current)

Memory (see page 2-27)

- RAM: Backed up for 72 hours
- EEPROM: Memorizing FW/RT ID, ENID, DNID

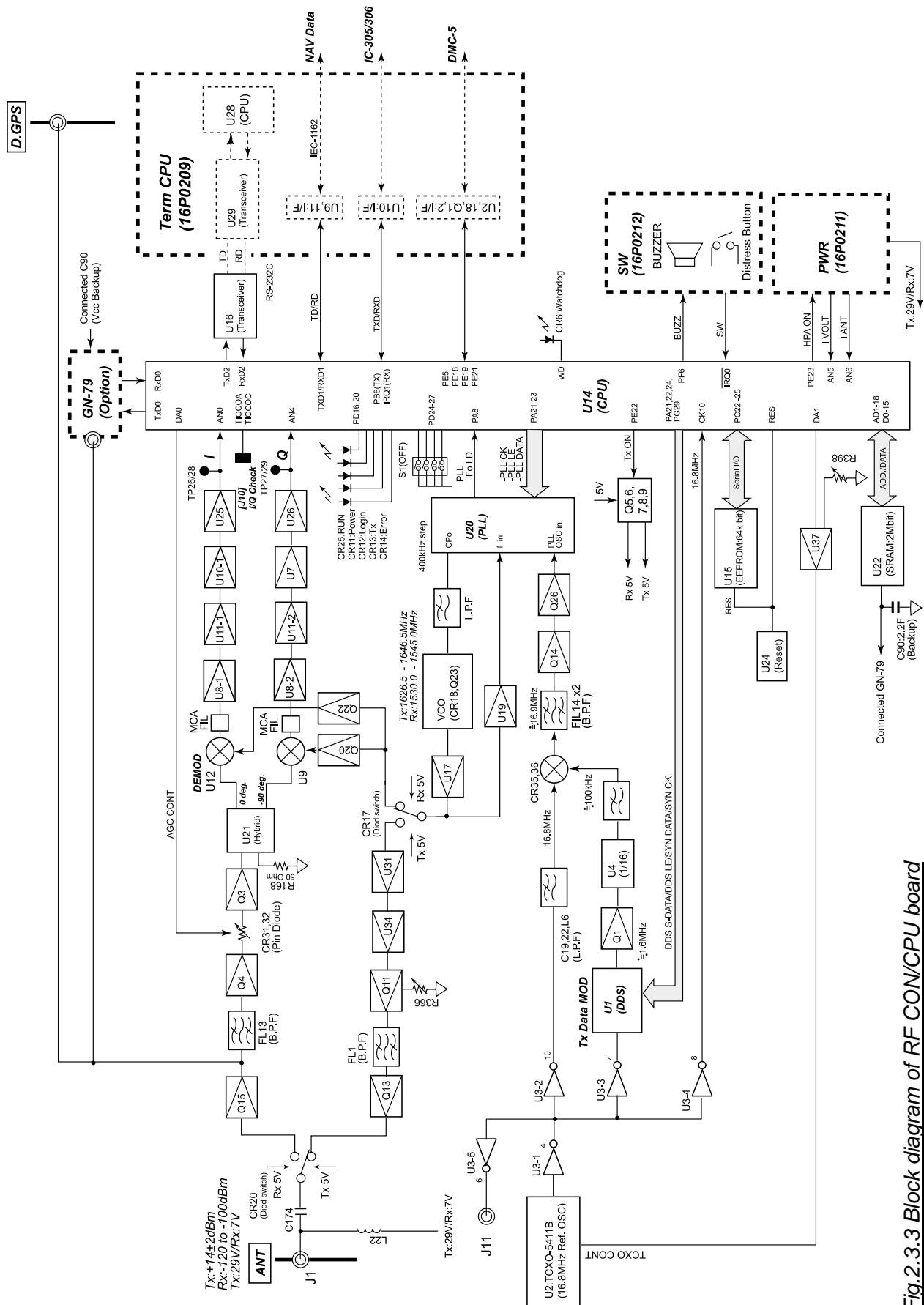


Fig.2.3.3 Block diagram of RF CON/CPU board

1) Receiving part

Receiving circuit

The RF signal from the antenna unit is input to the receiving circuit by the diode switch, CR20. FL13 of the receiving circuit is B.P.F of 1.5 GHz.

The BPSK modulating RF signal is changed to 1.2 kHz intermediate frequency at Hybrid (U21) and DBM (U12 and U9) and then input to CPU (U14) as I and Q signals. The local oscillator frequency input to DBM is 1.2 kHz lower than the receiving frequency.

The interference from MCA: Multi-Channel Access (1513 MHz to 1525 MHz) is reduced by L.P.F consisted of inductor and capacitor (about 5 MHz) after changing the frequency at U12/U9 (IF: 1.2 kHz).

At Hybrid, U21 and DBM, U12 and U9, the I signal and Q signal of 1.2 kHz IF signal are taken from the BPSK modulated receiving RF signal to input to CPU, U14.

The Lissajous waveform is monitored by [J10]. AGC is controlled by the pin diodes, CR31 and CR32. The AGC signal is generated from the I signal and Q signal input to CPU. The BPSK modulating signal is processed at U14 to send message to TERM CPU board.

The process of NCS/LCS TDM channel signal processing at U14 (CPU) is as follows.

BPSK de-modulation (I signal and Q signal)

- Detecting the unique word (Tuning the flame) -- De-permuting – De-Interleaving
- Viterbi decoding -- De-scramble -- Taking the packet --

Sending to TERM CPU board

Fig.2.3.4 shows the block diagram of the RF CON/CPU receiving circuit.

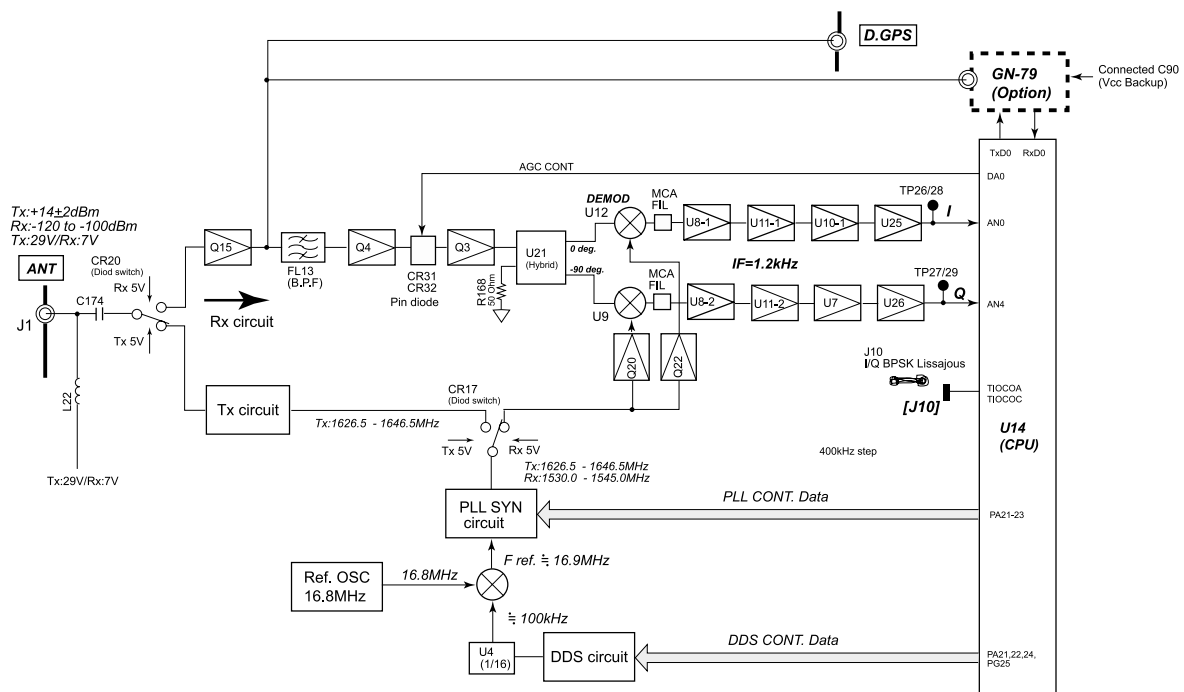


Fig.2.3.4 Block diagram of RF CON/CPU receiving circuit

Frequency control

For example, when the receiving frequency from the satellite differs from the carrier frequency input to the de-modulating circuit, the error rate is increased.

CPU detects the frequency difference and the phase difference of I signal and Q signal. The detection data controls the frequency of the TX/RX PLL synthesizer oscillator (TCXO: 16.8 MHz) so that the output frequency is equal to the receiving frequency by controlling the PLL synthesizer output frequency.

The standard oscillator, 16.8 MHz is controlled by the 1 kHz step at the first FFT.

Fig.2.3.5 shows the block diagram of the RF CON/CPU receiving frequency control.

The frequency complemented value is checked at “REF Offset Freq” in Status display. “OK” appears when the Offset Freq. is less than 150 Hz.

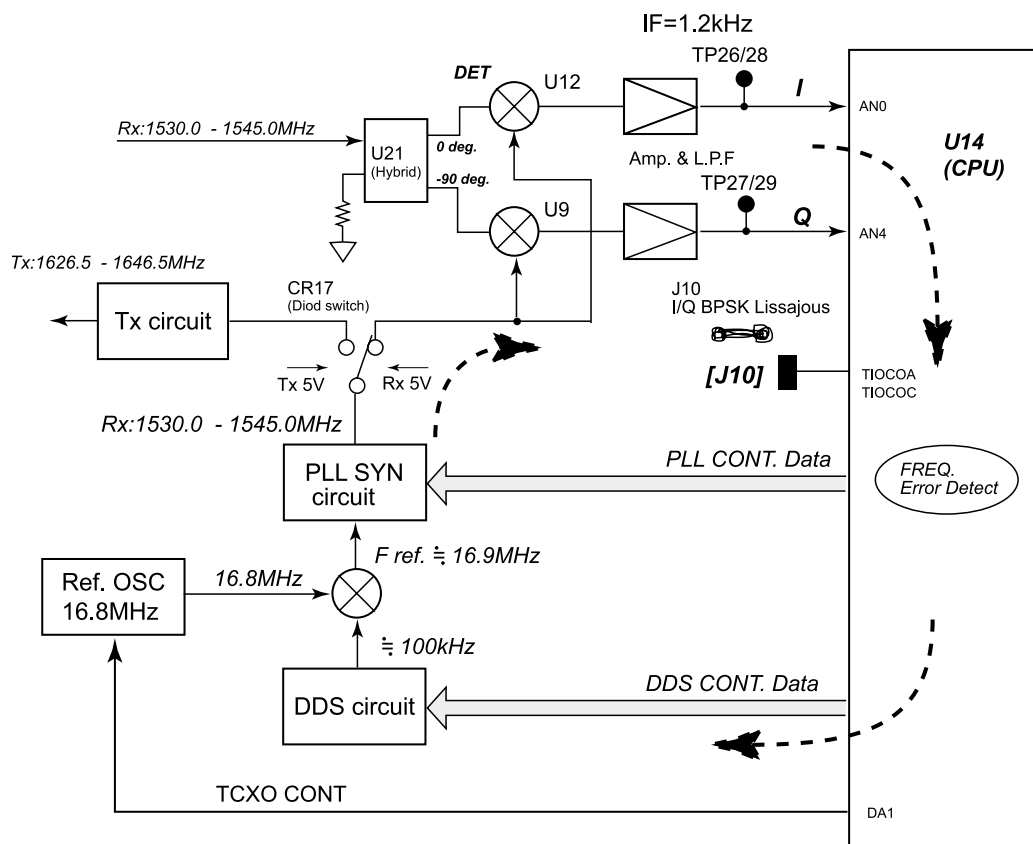


Fig.2.3.5 Block diagram of RF CON/CPU receiving frequency control

2) Transmission part

BPSK modulation

The transmission frequency is set at CPU. The data is processed by the data to be transmitted according to the channel below.

- Transmitting MES signaling channel

Message -- Scrambling -- Convolutional encoding -- Adding unique word -- BPSK modulating

- Transmitting MES message channel

Message -- Scrambling -- Convolutional encoding -- Adding unique word -- Interleaving -- Permuting encoder -- Adding pre-ambling -- BPSK modulating

- Transmitting NCS/LES TDM channel

Message -- Scrambling -- Convolutional encoding -- Adding unique word -- Interleaving -- Per-muting encoder -- BPSK modulating

DDS (AD9832) modulates the phase of the DDS output frequency. The BPSK modulating is made at DDS by the input digital data. PLL oscillation output frequency is 1.6 GHz band which is BPSK modulated. This signal is the transmitting output of the terminal unit with amplifying to the output of +14 dBm.

Fig.2.3.6 shows the block diagram of RF CON/CPU transmission frequency control.

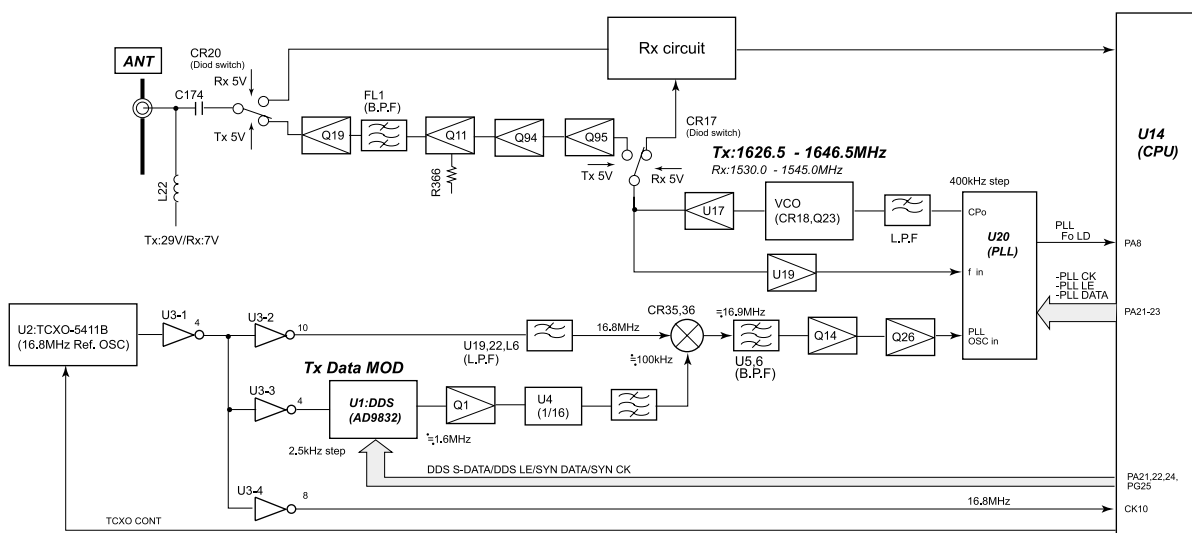


Fig.2.3.6 Block diagram of RF CON/CPU transmission frequency control

PLL and DDS circuit

DDS output is about 1.6 MHz. When transmitting, it is BPSK modulated. Fig.2.3.7 shows the block diagram of DDS.

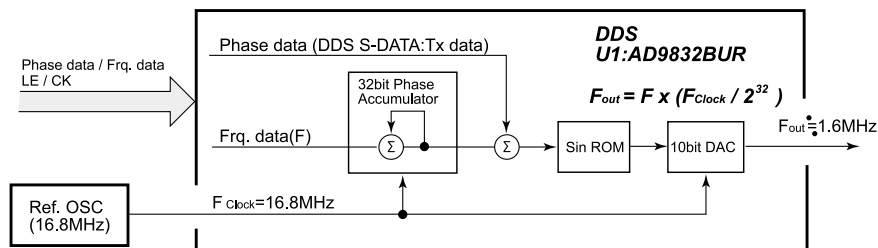


Fig.2.3.7 Block diagram of DDS

U4 divides it into 16 frequencies to change to about 100 kHz. About 100 kHz is mixed to the reference oscillation frequency, 16.8 MHz to generate about 16.9 MHz. This frequency is input to PLL OSC in U20 and divided into 42 frequencies to generate 400 kHz. This frequency is the reference frequency of PLL synthesizer circuit, so that PLL frequency step is 400 kHz.

Fig.2.3.8 shows the block diagram of PLL.

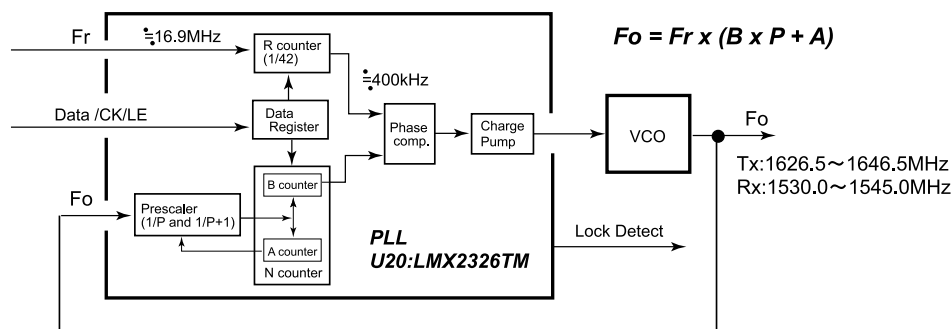


Fig.2.3.8 Block diagram of PLL

Before generating the standard frequency of PLL synthesizer circuit, PLL reference frequency, that is, DDS output frequency is used based on the necessary oscillation frequency. The used data is the frequency data sent to DDS which is 2.5 kHz step.

Fig.2.3.9 shows the frequency step of PLL and DDS.

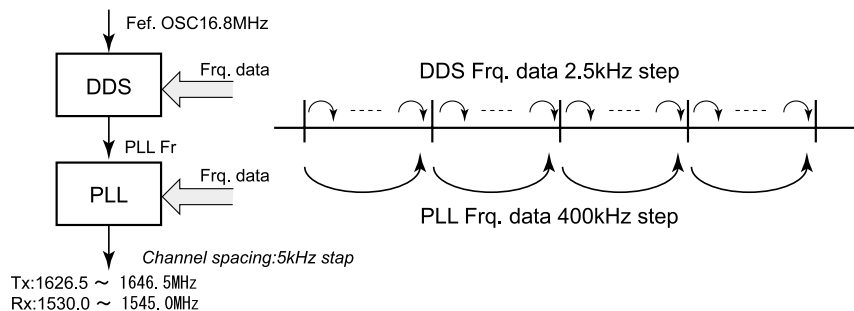


Fig.2.3.9 Frequency step of PLL and DDS

3) CPU

CPU, HD64F7065 is 32 bit single chip microcomputer with DSP function. It consists of ROM (256 kbyte), RAM (8 kbyte), A/D (8 channels), D/A (2 channels), Timer (8 channels), watch-dog timer (1 channel) and Serial communication I/F (3 channels).

RF CON/CPU board communicates with TERM CPU board by TD and RD signals which are I/F of RS-232C.

- Controlling communication protocol of Inmarsat C.
- TX/RX Signal processing
- AGC controlling
- Communicating with TERM CPU
- Controlling the IC-305 and the IC-306
- Monitoring SYN, V CHK and I ANT signals
- Changing TX and RX circuit
- Controlling PLL and DDS circuit
- Handling of NMEA data

Fig.2.3.10 shows the CPU connecting signal.

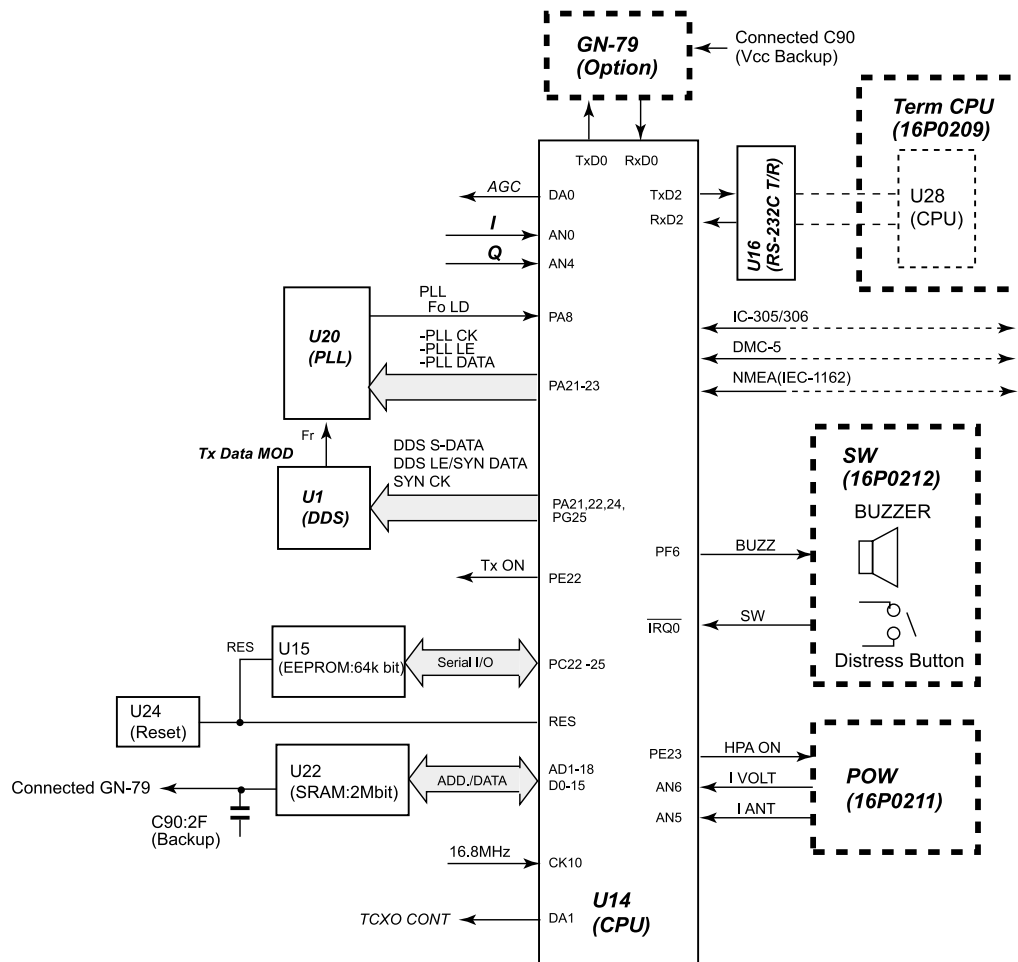


Fig.2.3.10 CPU connecting signal

4) Memory

EEPROM (8 kbyte) and SRAM (256 kbyte) are connected to CPU. SRAM is backed up by C90 (2.2 F) super capacitance for 72 hours.

Table 2.3.1 lists the memory contents of RF CON/PU board.

Table 2.3.1 Memory contents of RF CON/CPU board

Memory	Volume	Contents
SRAM (U22, CY62136VLL)	256 kbyte	[F7]-6:LES information
EEPROM (U15, CAT25C64AP)	64 kbyte	Forward/Return ID: 2x3 bytes
		ENID, DNID: 64x2 bytes
		[F8]-1, [F8]-2, [F8]-5, [F8]-9-3, [F8]-9-4, [F7]-5, [F7]-7-2 (See page 2-27)

Note) When replacing RF CON/CPU board, remove the EEPROM(U15) old board and put it on the new board.

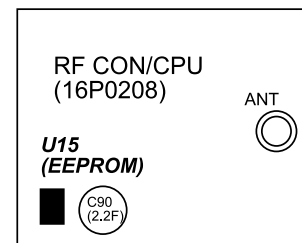


Fig.2.3.11 Configuration of EEROM

Forward/Return ID

This is the secret ID used for the communication between MES and LES. Forward ID is used from LES to MES, Return ID is used from MES to LES.

The sum of both ID is 2x3 bytes. Each ID is 6-figure HEX code.

DNID

After making a contract, the information provider sends the ID for data network (DNID) to MES via LES.

The service such as data reporting is based on the DNID. When DNID is received from LES, it is listed into "F5-3/Data Network ID" automatically. DNID information consists of 2 bytes.

ENID

To get the EGC broadcasting Fleet NET service, the contract is needed. The information provider sends the ID for group call (ENID) to MES via LES.

When ENID is received from LES, it is listed into "F4-2/EGC Network ID List" automatically.

DNID information consists of 2 bytes.

5) Handling of NMEA

The external NMEA signal is connected to RF CON/CPU board via [JUNCTION] port. GPS receiver, GN-79 (Option) is installed. The selection of the external or internal NMEA data is set by "NAV Port" ([F8]-2: System setup).

The priority sequence of the talker is GP>TR>LC>LA>DE>OM>II>IN. The priority sequence of the position data is GGA>RMC>GLL>RMA.

Fig.2.3.12 shows the NMEA data connection.

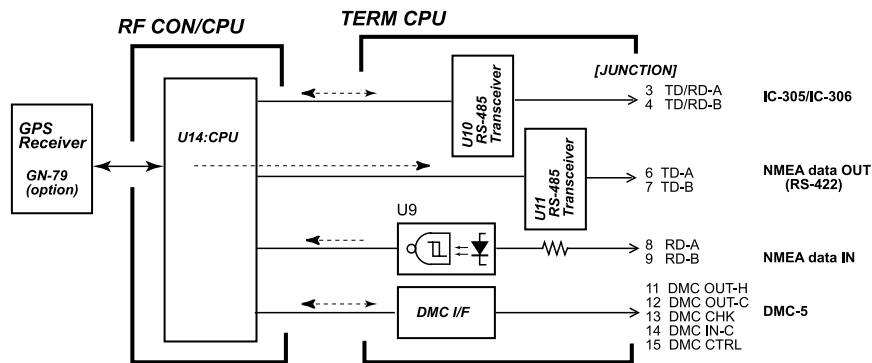


Fig.2.3.12 NMEA data connection

Table 2.3.2 Receivable NMEA data

Formatter	Nera C receiving formatter	GPS (GN-79) formatter output	Description
GGA		O	GPS fix data
GLL	O(Ver2.0)	O	Geographic position, L/L
GSV		O	GNSS satellites in view
WPL	O		Waypoint location
VTG	O	O	Course over ground and speed
RMA	O		Recommended minimum specific LOLAN-C data
RMB	O		Recommended minimum navigation information
RMC	O	O	Recommended minimum specific GNSS data
MTW	O		Water temperature
DBT	O		Depth below transducer
BWC	O		Bearing and distance to waypoint
BWR	O		Bearing and distance to waypoint, rhumb line
VDR	O		Set and drift
ZDA		O	Time and date

Optional GPS receiver, GN-79

- NMEA-0183 Ver.2.3
- Receiving frequency: 1575.42 MHz
- Receiving channel/ tracking: 12 channels/Parallel
- UTC tuning pulse output: 1 second pulse
- Datum: WGS 84
- Tracking code: C/A code
- Maximum tracking satellite: 12

6) Connecting IC-305 and IC-306

The Distress Alert Received unit, IC-305 and Alarm unit, IC-306 (a maximum of 3) are connected to RF CON/CPU board via RS-485 rating interface.

The function of the distress alert and the incoming indicator of the distress message and the emergency messages are provided to IC-305.

IC-305 and IC-306 are connected in parallel. Each unit is recognized by the jumper setting. RF CON/CPU board is communicated with IC-305 and IC-306 at 1200 bps. No regular communication with DMC-5.

Fig.2.3.13 shows the IC-305 and IC-306 connection.

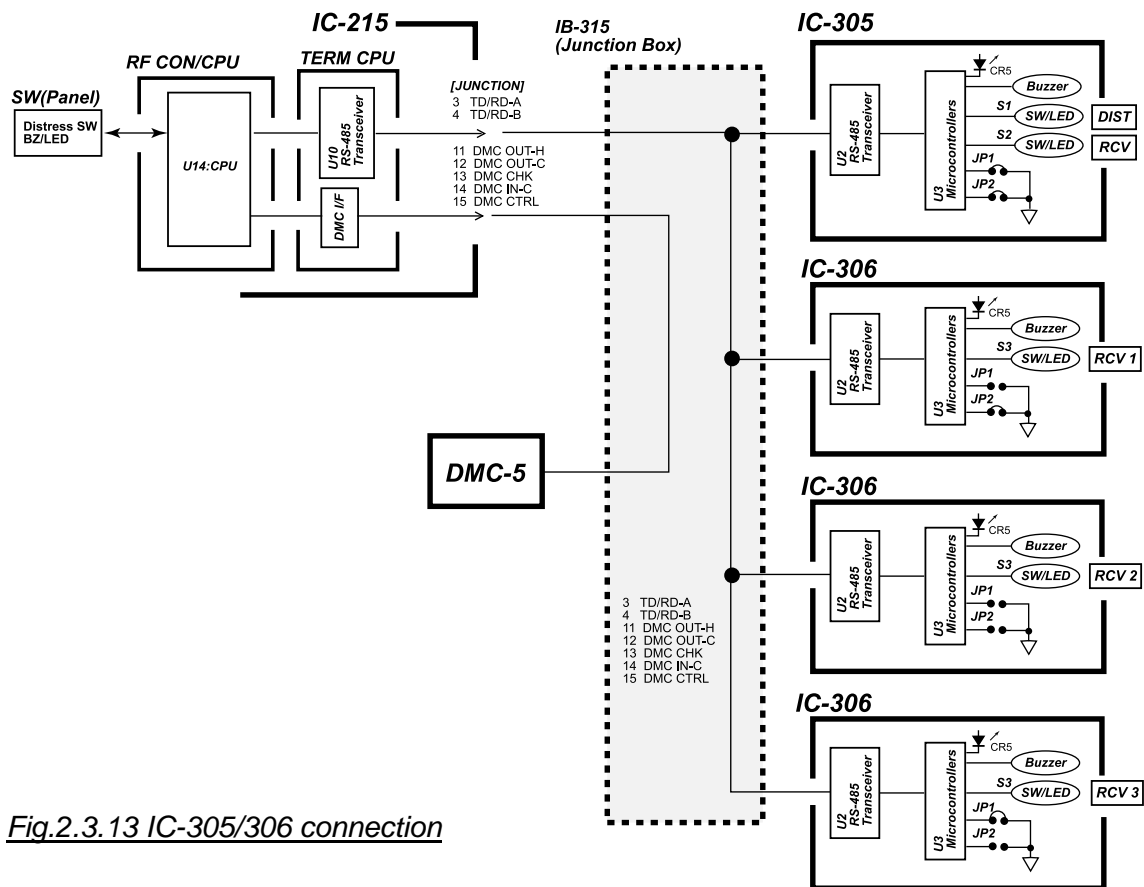


Fig.2.3.13 IC-305/306 connection

Table 2.3.3 Jumper setting of IC-305/306

	IC-305 (DIST)	IC-306 (RCV1)	IC-306 (RCV2)	IC-306 (RCV3)
JP 1	Jumper	Open	Jumper	Open
JP 2	Jumper	Jumper	Open	Open
S1, 2	Yes	No	No	No
S3	No	Yes	Yes	Yes

7) Handling of Alarm

Table 2.3.4 lists the alarm output.

Table 2.3.4 Alarm output

Unit	TLX/E-mail reception	DIS ACK reception	EGC message reception			Alarm when detecting "TROUBLE"
			DIS	URG	Category following to SAF	
IC-215	Output	Output	Output	Output	Not output	Output
IC-305	Not output	Output	Output	Output	Not output	Not output
IC-306	Output	Not output	Not output	Not output	Not output	Output

Table 2.3.5 lists the difference of the alarm between IC-305 and IC-306.

Table 2.3.5 Difference of the alarm between IC-305 and IC-306

Unit	Status	LED	Buzzer
IC-305 (Distress button)	Normal	Lights out	OFF
	Distress button: ON	ON/OFF every 100ms	ON/OFF every 100ms
	Distress activates	Lighting	ON
	Receiving Distress ACK	1.2S ON, 0.3S OFF	1.2S ON, 0.3S OFF
IC-305 (ALM ACK button)	Normal	Lights out	OFF
	ALM ACK switch: ON	ON while pressing	ON while pressing
	EGC: After receiving DIS and URG priority message	1.2S ON, 0.3S OFF	1.2S ON, 0.3S OFF
	EGC: After receiving DIS and URG priority message ALM ACK Switch: ON	0.1S ON, 1.9S OFF	0.1S ON, 1.9S OFF
IC-306 (ALM RESET button)	Normal	Lights out	OFF
	ALM RESET switch: ON	ON while pressing	ON while pressing
	After receiving the message	1S ON, 2S OFF	1S ON, 2S OFF
	After receiving the message ALM RESET switch: ON	Lights out	OFF
	Detected the error ^{see note)}	1S ON, 2S OFF	1S ON, 2S OFF
	After detected the error ALM RESET Switch: ON	0.1S ON, 1.9S OFF	0.1S ON, 1.9S OFF

Table 2.3.6 lists the alarm stop.

Table 2.3.6 Alarm stop

Unit	Reset switch	Action
IC-215	[F10]: Stop Alarm	All alarm is stopped.
IC-305	ALARM ACK (Receiving EGC msg.)	The alarm period is changed. (From 1.2S ON, 0.3S OFF to 0.1S ON, 1.9S OFF)
IC-306	ALARM RESET	After receiving: Only the alarm of the unit which reset switch is pressed is changed its alarm period.
		Detecting the error: Only the alarm of the unit which reset switch is pressed is stopped.

Note) "ALM" is released by following condition.

"WARNING: Synchronization loss. Please check the current Ocean Region."

(When the RX signal is not received, the scanning is not made automatically. Select the proper ocean region.)

- "BBER" is over 80 %

"BBER over 80%. Scanning NCS start manually."

(When the RX signal is not received, the scanning is not made automatically. Select the proper ocean region.)

- Printer paper empty

"Can't print. PRINTER NOT READY."

"Can't print. Paper Low."

- When the data from internal GPS and the external NAV is not input

"WARNING: Internal GPS UNIT failure."

"WARNING: External NAV equipment failure."

- When the position data is input manually and the position data updating is requested (every 4 hours)

"INF: Please update current ship position."

- When detecting the error, the following messages appear.

"TROUBLE: ANT power voltage abnormality"

"TROUBLE: ALARM UNIT Fault"

"TROUBLE: DMC Connection abnormality"

"TROUBLE: DISTRESS ALERT Fault"

"TROUBLE: Synthesizer UNLOCK"

"TROUBLE: Carrier Power Level"

"TROUBLE: GPS module"

"Memory full for received msg."

2.3.2 TERM CPU board (16P0209)

TERM CPU board, which is the same as the terminal unit of Nera C 12, controls LCD, a printer, a keyboard, FDD, Ethernet and DTE (PC).

Fig.2.3.14 shows the block diagram of the TERM CPU board.

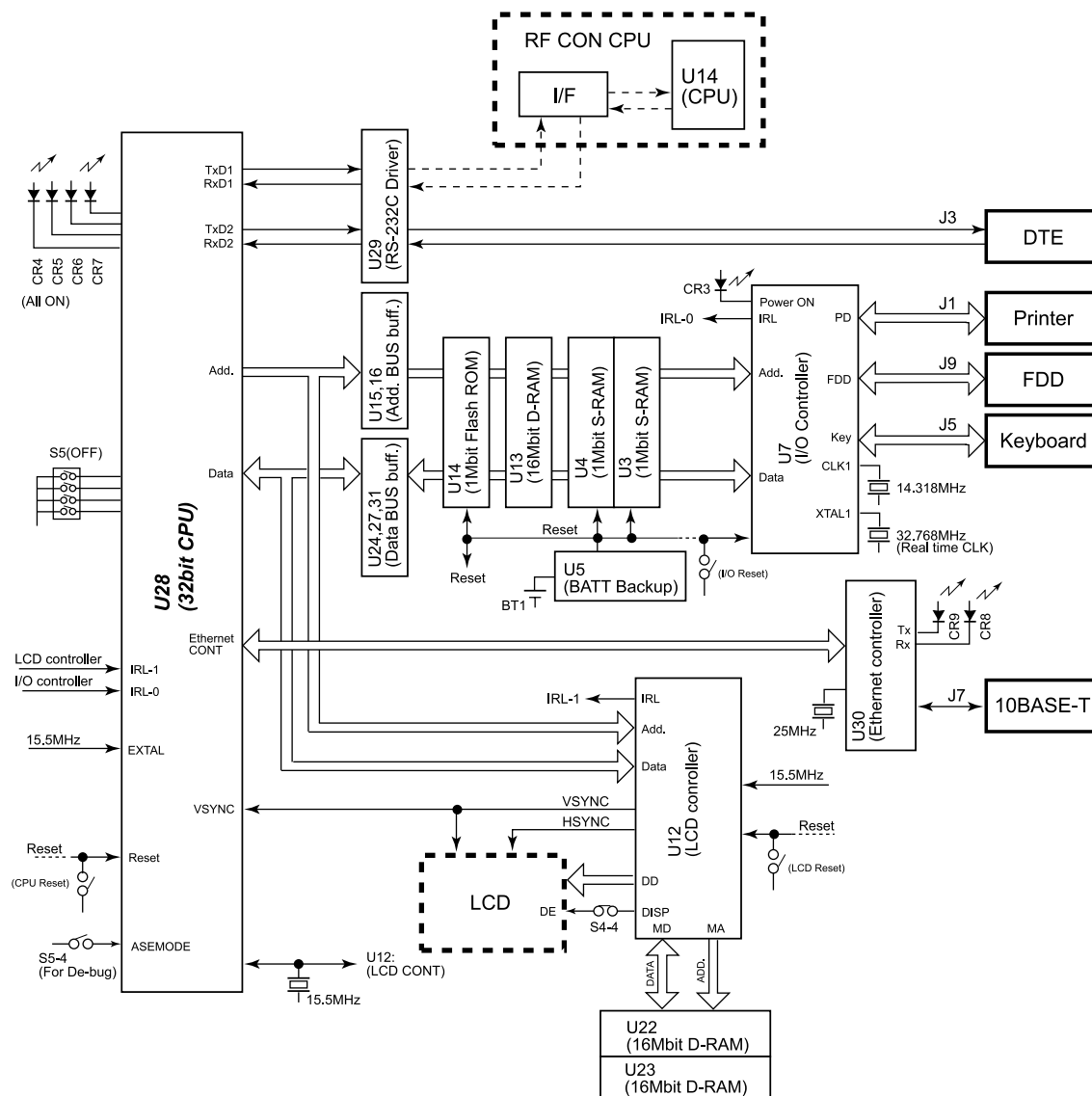


Fig.2.3.14 Block diagram of TERM CPU board

The function is as follows.

- Communicating with RF CON/CPU board (RS-232C, Asynchronous communication)

Baudrate : 4800
 Data length : 8 bits
 Stop bit : 1 bit
 Parity : ODD
 Flow control line: Yes
 Communication control: Only TX/RX data

- LCD (U12) control: 640x480 pixel 262,144 color display
 (In specification, IC-215 display uses 16 colors.)
- Backed up by Lithium battery
- Printer connection (U7) : Connecting the Centronics conformance printer (PP-510)
- Keyboard connection (U7): Connecting the PC keyboard
- FDD (U7): For 2HD/2DD
- LAN: Ethernet
- Connecting to PC (DATA)

1) Communicating RF CON/CPU board

RF CON/CPU board reply to the command from TERM CPU board if necessary while the TERM CPU board does not reply to the command from RF CON/CPU board.

When the RF CON/CPU board does not replay to the command within 2 seconds, TERM CPU board sends the command up to 2 times. If the RF CON/CPU board does not replay after that, the error message **“No response from Communication unit”** appears.

Commands from TERM CPU board to RF CON/CPU board

- 1) Outputs when changing EGC channel (F8-9-3). The data is memorized by RF CON/CPU board. Note: One wave operation only
- 2) When Abort (F7-3) operating. This command is to stop the current processing, such as scanning and transmitting.
- 3) When operating Alarm Stop (F10).
- 4) When the transmission is started, the storing area of the TX message is provided to the memory on RF CON/CPU board.
- 5) Login (F7-1). (Login started).
- 6) Logout (F7-2). (Logout started.)
- 7) When “Forced clear” is operated such as [F7]-3 and [F3]-2. (Displays Forced Clear started.)
- 8) When starting the transmission of the message.
- 9) When starting PV TEST (F7-7-1). (Performance Verification Test started.)
- 10) When canceling the TX message (F3-2/Cancel). Cancels when the message status is Pending, Rejected, Fail or Waiting. Opens the storing area of TX message.
- 11) When requesting the message delivery (F3-3/Request Delivery Status).
- 12) When selecting the common channel (F7-4/Select NCS).
- 13) When selecting the ocean region (F7-5/Ocean Region).
- 14) When forwarding Receiver Message Log and EGC Log (F6-2 and 3).

- 15) When starting the data report (F5-1).
- 16) When starting the self test for RF CON/CPU board (F7-7-3).
- 17) When starting the Distress Button Test (F7-7-4).

Information from RF CON/CPU board to TERM CPU board

- 1) When receiving the network information.
- 2) The information of the current channel type (NCSCC, LES TDM, MES Sig.CH, MES Msg.CH and Retuning)
- 3) The description of the RX message (LES ID, Date, Priority, Size, Msg. Refe. No., Sub Add.)
- 4) EGC message
- 5) Login/out status
- 6) The information of tuning TDM Bulletin Board and SCD(signaling channel descriptor).
- 7) The number of the RX message in RF CON/CPU board.
- 8) BBER. Sends every 8.64 seconds.
- 9) The information of the current TDM information (Not Synchronized., NCSCC, LES TDM, Joint NCSCC and TDM, and ST-BY NCSCC)
- 10) The information of the tuning NSC information
- 11) PV Test result
- 12) The transmitting result of the message (F6-1). (Sending, Success, Failed, Rejected, Pending, Unknown)
- 13) The delivery information of the message (F3-3). (Msg. Refe No., Status, Attempts, Failure Code and Add.)
- 14) MES status. (The information appeared in the display below.)
- 15) Displaying of the position data. Blinks if not updated within 4 hours.
- 16) Displaying of the WP data
- 17) Displaying of the self status (Updates every 5 seconds: BBER, C/N, Send Level, RX AGC Level, REF Offset Freq., Syhnthe Local, Antenna Power Supply)
- 18) Displaying the result of the self test.
- 19) Caution command when the error occurs from RF CON/CPU board.
- 20) Polling data (F5-1)

2) Controlling LCD (In specification, IC-215 display uses 16 colors)

U12, HD64412F controls the LCD of TFT (Thin Film Transistor color liquid crystal display) active matrix. It is 262,144 color display and the control line, R, G and B has 6 lines. The standard color is gray, blue, red, magenta, green, cyan, brown, yellow, white and light white. The color of the display is set by [F8-4/Window Color]. The LCD angle of field is;

Horizontal: right and left 70°; vertical: 45° for upside, 55° for downward.

**CAUTION**

Be careful not to damage the glass of LCD panel and the backlight.

3) Ethernet

Ethernet (10BASE-T) port is installed to connect to LAN. POP3 and SMTP is installed to the terminal unit.

- SMTP (Simple Mail Transfer Protocol)
Protocol for forwarding the mail between the mail servers on the network.
- POP3 (Post Office Protocol)
Protocol for forwarding the mail received at the mail server to the local computer.

E-mail service such as “Out Look” is available by connecting Nera C to LAN.

The network of Nera C is set by [F8]-2 “Network”.

Fig.2.3.15 shows the connection example when using KDDI SatMail-C service.

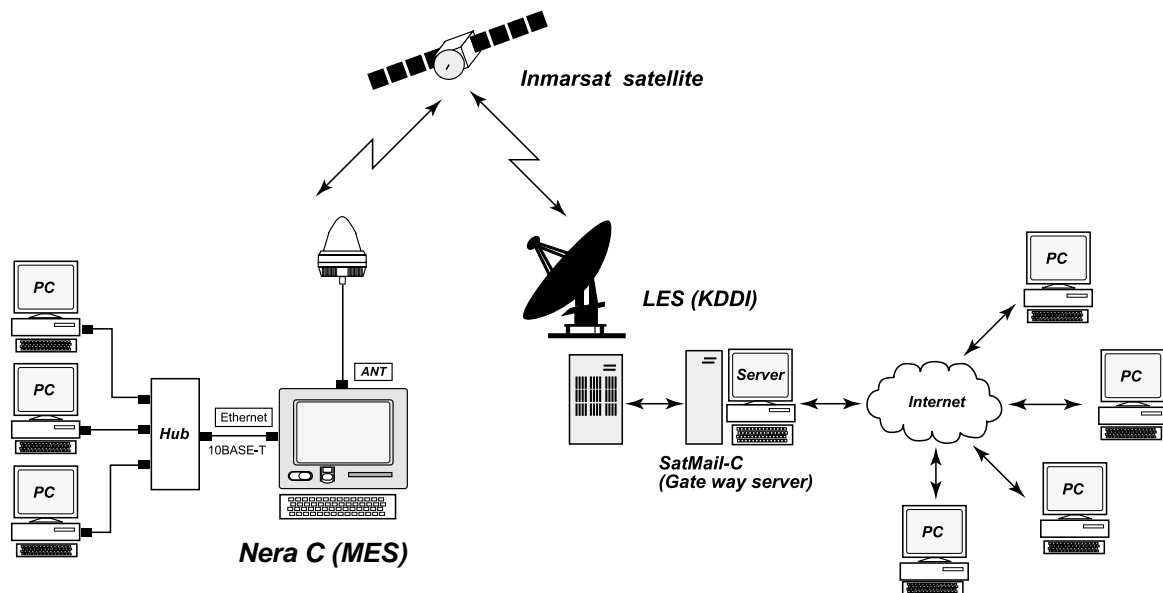


Fig.2.3.15 Example of Network

Table 2.3.7 [F8]-2 System Setup menu (abstract)

Network	IP Address	Note) When OFF is selected in DHCP setting.
	Subnet mask	
	DHCP	ON
		OFF
	Gateway	
Mail Gateway	SMTP Enable IP Address	
	Send Limit Size(KB)	2, 4, 6, 8, 10, 16, 32
	Attach	UUENCODE
		BINARY
	Delivery To	PC Mailer
		Server
	Server IP	
	Address Mode	FIXED
		Auto
	Mail Address	Note) When FIXED is selected in Address Mode
	Mail Address Keyword	Note) When Auto is selected in Address Mode

**** Network ** (Refer to AP-4)**IP Address/Subnet Mask

Default settings are as below.

IP address: 172.31.16.1
Subnet mask: 255.255.0.0

DHCP(Dynamic Host Configuration Protocol)

With DHCP turned on, IP address and subnet mask are automatically assigned when a DHCP server resides on a LAN. The default DHCP setting is OFF.

Gateway

Set gateway IP address when mail is sent from a PC on a different network through a router.

**** Mail Gateway ** (Refer to AP-4)**SMTP Enable IP Address

Specify the IP address of the PC which is to be used to send and receive e-mail. A PC not specified cannot send e-mail but it can receive e-mail. If no IP address is specified, all PCs connected to the LAN can send and transmit e-mail.

Send Limit Size(KB)

To choose maximum message size to send within shipboard LAN. The choices are 2, 4, 6, 8, 10 and 32 (KB).

Attach

Using the default setting, mail (MIME encoded) sent from a PC in a network is encoded with UUENCODE. For Inmarsat C use UUENCODE.

Delivery To: PC Mailer/Server

- PC Mailer: Received messages are stored in the Nera C. Messages are transmitted by the PC's e-mail client.
- Server: When a mail server is installed on a LAN, received mail is forwarded to the mail server via the LAN.

Server IP

When Server is selected in "Delivery To" setting.

Address Mode

- FIXED: *When Server is selected in Delivery To setting;*
Message is sent mail address specified in Mail Address.
- Auto: *When Server is selected in Delivery To setting;*
When the keyword (entered in Auto Delivery Keyword) is found in the text of a message, the message is sent to the address which appears after the keyword. If the keyword is not found the mail is delivered to "Mail Address."

Mail Address

When FIXED is selected in Address Mode setting. Refer to "Address Mode" setting.

Mail Address Keyword

When Auto is selected in Address Mode setting. Refer to "Address Mode" setting.

4) Back up

I/O interface of U7 (FDC37C935APMQFP), which has RTC function and the function of the interface of the printer and FDD, and S-RAM of U3 and U4 (K6T1008C2E) are backed up by Lithium battery. The RTC data is used as a time stamp;

- [F1]-3: Save
- [F6]: Log

2.3.3 Memory contents

Table 2.3.8 lists the volume and the memorized contents of each memory.

Table 2.3.8 Memory volume

Board	Parts number	Model	Volume	Remarks
RF CON /CPU (16P208)	U22: S-RAM	CY62146VLL	256 kbyte	Backup (C90)*
	U15: EEROM	CAT25C64P	64 kbits	Serial EEPROM
	U14: CPU	HD64F7065A	256 kbyte	Built-in ROM
			8 kbyte	Built-in RAM
TERM CPU (16P0209)	U3and U4: S-RAM	K6T1008C2E	(128 Kx8)x2	Backup (BATT-1)**
	U14: Flash ROM	MBM29F800BA	8 M bits	
	U22 and U23: D-RAM	MSM5118165D F	1 M (word)×16 (bit)×2	
	U13: D-RAM	MSM5118165D F	1 M (word)×16 (bit)	
	U28: CPU	HD6417615 AF	8 k bytes	Built-in RAM

Note)

*: S-RAM, U22 on RF CON/CPU board is backed up by the charge of the capacitor, C90 (2.2F) for 72 hours as well as optional GPS board, GN-79.

** : S-RAM, U3 and U4 on TERM CPU board is backed up by the lithium battery (BATT-1: CR2450 F2ST2L) for more than 2 years. The battery life is about 5 years.

The memory contents of DRAM used to TERMCPU board is as follows.

- U22 and U23
- U13

Table 2.3.9(a) Memory contents

Contents		Saving area				
		RF CON/CPU(16P208A)			TERM CPU(16P0209)	
		U22:S-RAM Backup(C90)	U15: EEPROM	U14: CPU	U3,4:S-RAM Backup (BATT-1)	U14: Flash ROM
F4: EGC	1.Display EGC Message				O (32k Byte)	
	2.EGC Network ID(ENID)		O(64)			
F5: Report	1.Data Report				O(x4)	
	2.Message Report				O(x4)	
	3.Data Network ID(DNID)		O(64)			
F6: Log	1.Send Message Log				O (Max. 32k Byte:32 logs)	
	2.Receiver Message Log				O (Max. 32k Byte:32 logs)	
	3.EGC Log				O (Max. 32k Byte:32 logs)	
	4.Log				O(50 logs)	
F7: Option	5.Ocean Region		O			
	6.LES Information	O				
	7-2.PV Test Result		O			
F8: Setup	1.Distress Alert Setup		O			
	2.System Setup		O			
	3.Editor Setup				O	
	4.Terminal Setup				O	
	5.EGC Setup		O			
	6.Auto Mode Setup				O	
	7.E-Mail Setup				O	
	8.Directories				O	

Table 2.3.9(b) Memory contents

Contents		Saving area				
		RF CON/CPU(16P208A)			TERM CPU(16P0209)	
		U22:S-RAM Backup(C90)	U15: EEPROM	U14: CPU	U3,4:S-RAM Backup (BATT-1)	U14: Flash ROM
F8: Setup	9-1.Station List				○ (99 stations)	
	9-2.LES List				○ (44 stations x4)	
	9-3.EGC Channel List		○ (4ch x4)			
	9-4.NCS Channel List		○ (20ch x4)			
	9-5.E-Mail Service List				○	
Forward/Return ID			○			
RF CON/CPU Program				○		
TERM CPU Program						○
Internal GPS (option)		○ (Power: Backup)				
TERM CPU(16P0209) : U7(RTC)					○	

Note)

When replacing RF CON/CPU board, remove the EEPROM from the old board and put it on the new board.

2.3.4 PWR board (16P0211)

The input voltage of this switching power supply is from 10.8 V to 31.2 V. The maximum output current is 13 A when the input voltage is 10.8 V.

Fig.2.3.16 shows the block diagram of the PW board.

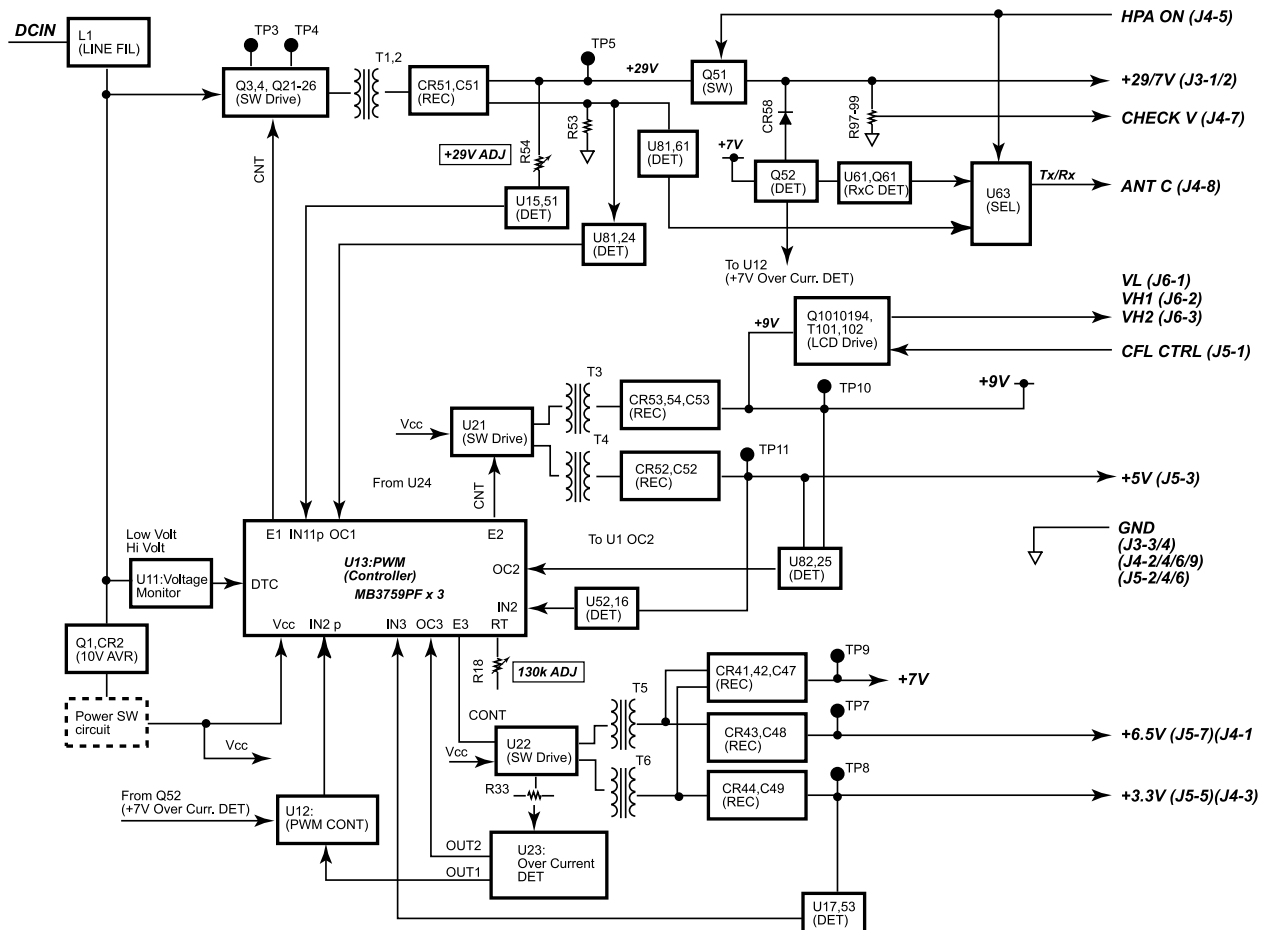


Fig.2.3.16 Block diagram of PW board

Output voltage

- +29V (TX: 3A)/+7V (RX: 0.2 A): Antenna unit power supply (Controlling by the HPA ON signal from RF CON/CPU board.)
- +6.5V, +3.3V and +5.0V
- VH1 and VH 2: Power supply for LCD (Controlling CFL CTRL signal from TERM CPU board.)

Protection circuit

- Protecting from the reversed polarity connection (Setting the diode at the power input part to fuse the power cable.)
- Protecting from the over current.

Detecting status monitoring signal

- CHECK V: Detecting “Antenna Power Supply” of the status monitor.
- ANT C: Detecting “Send Level” of the status monitor.

Chapter 3. Location of Parts

3.1 Terminal unit, IC-215

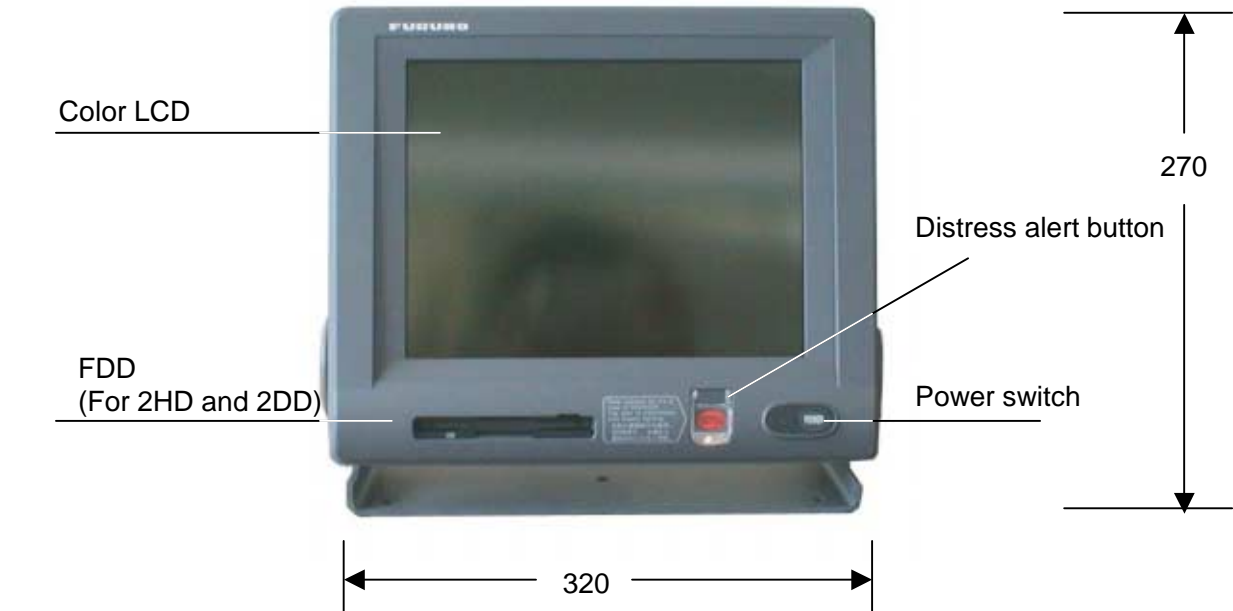


Fig.3.1.1 Terminal unit, front view

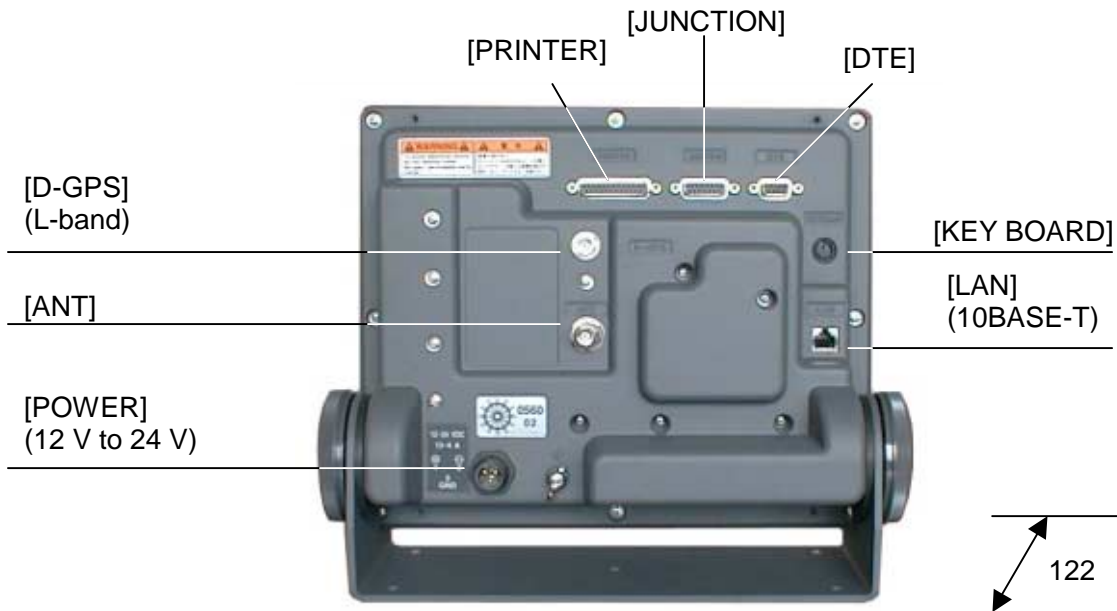


Fig.3.1.2 Terminal unit, rear view

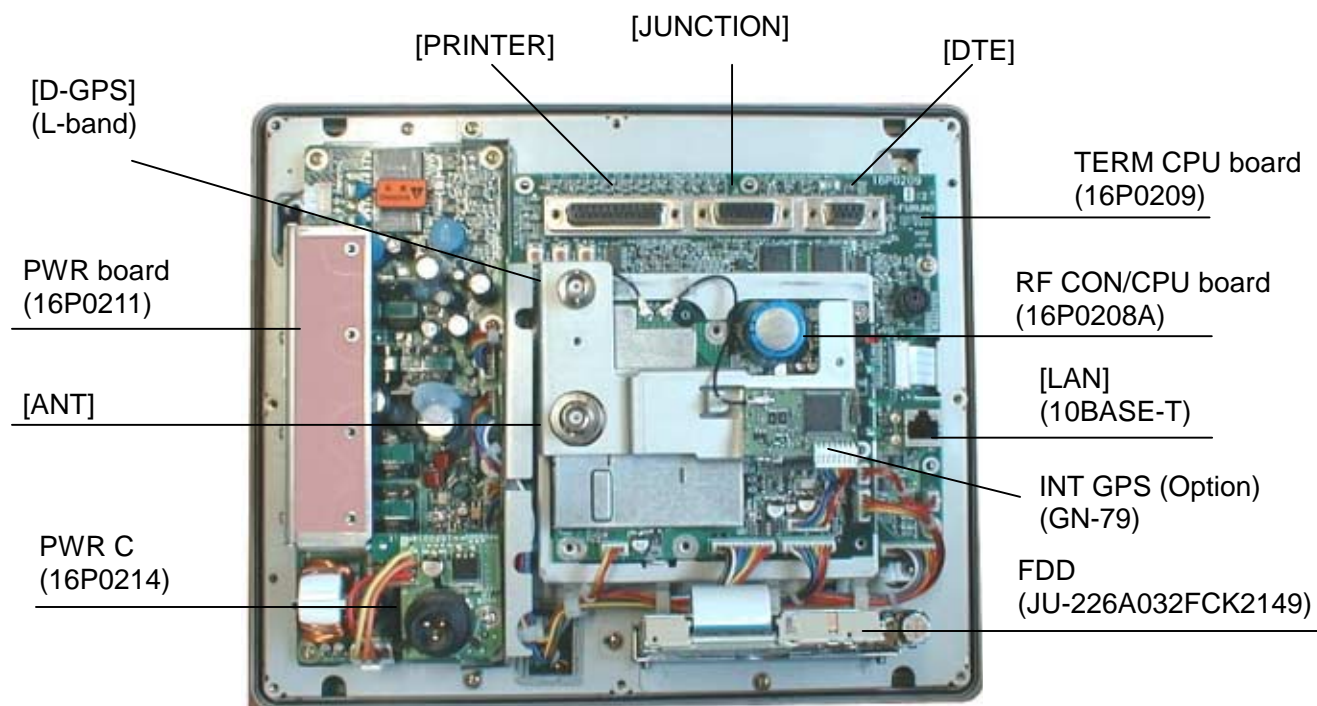


Fig.3.1.3 Boards in Terminal unit with cover removed

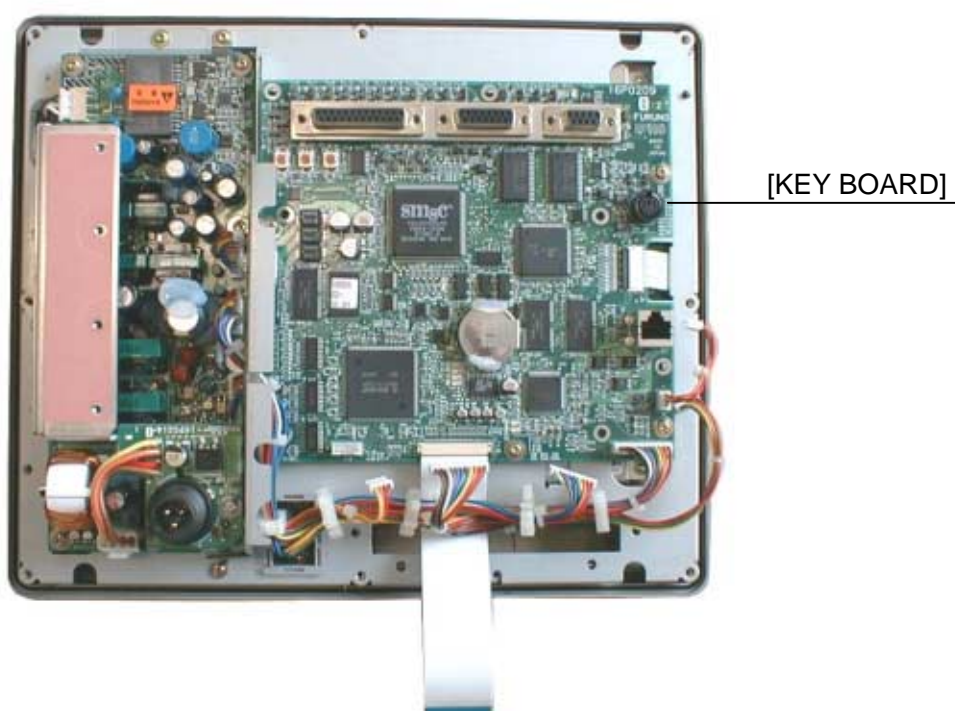


Fig.3.1.4 Terminal unit with RF CON/CPU board removed

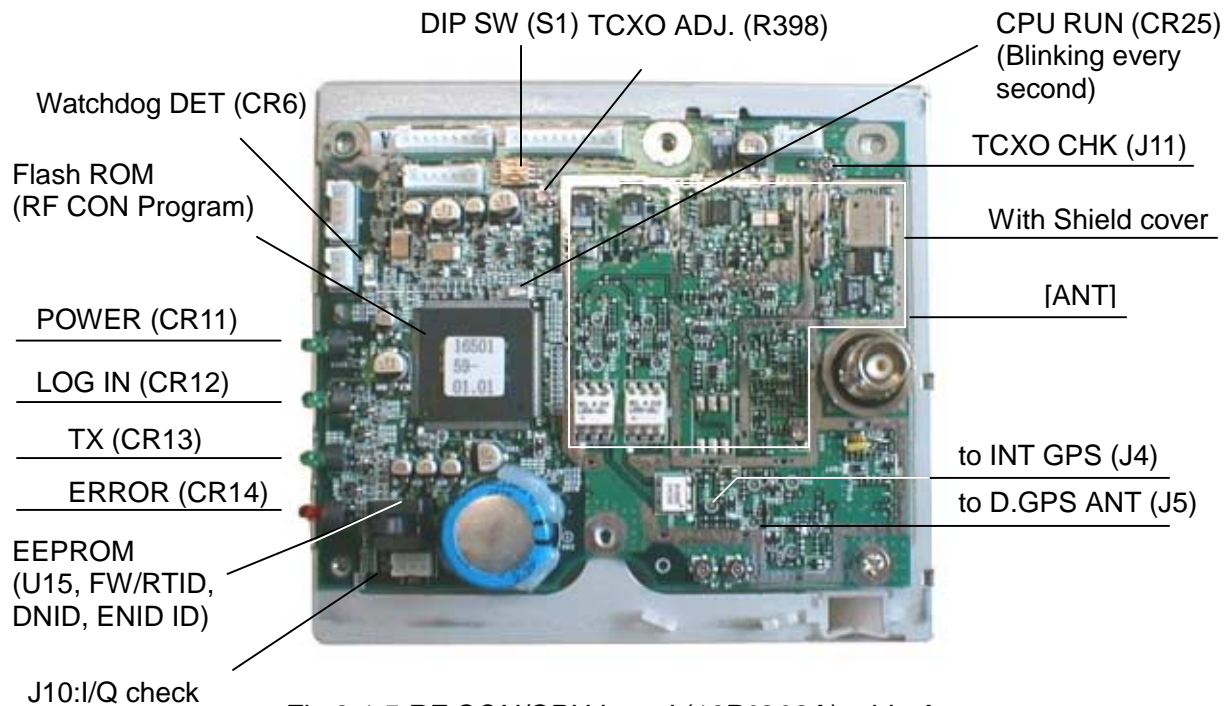


Fig.3.1.5 RF CON/CPU board (16P0208A), side A



Fig.3.1.6 RF CON/CPU board (16P0208A), side B

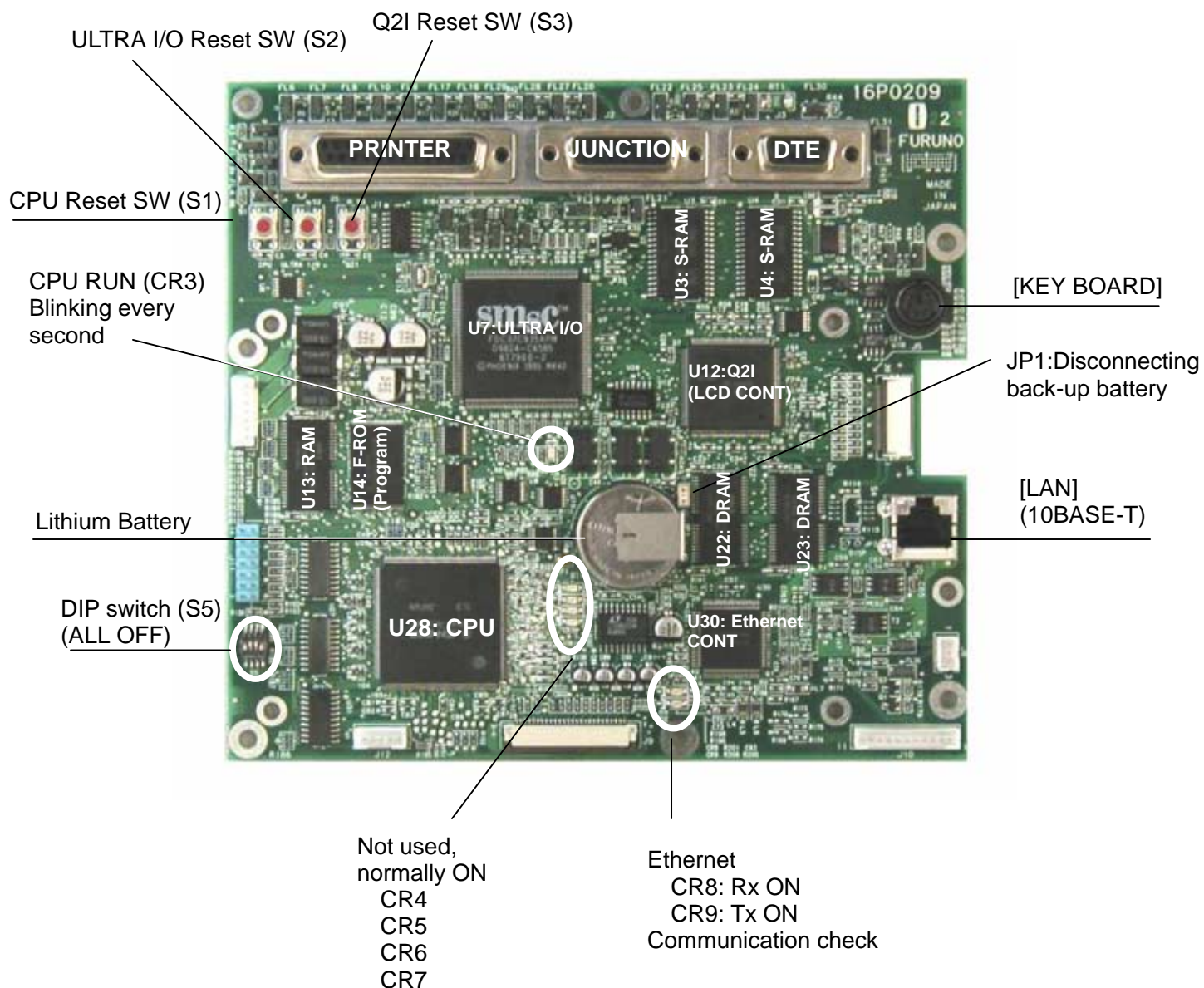
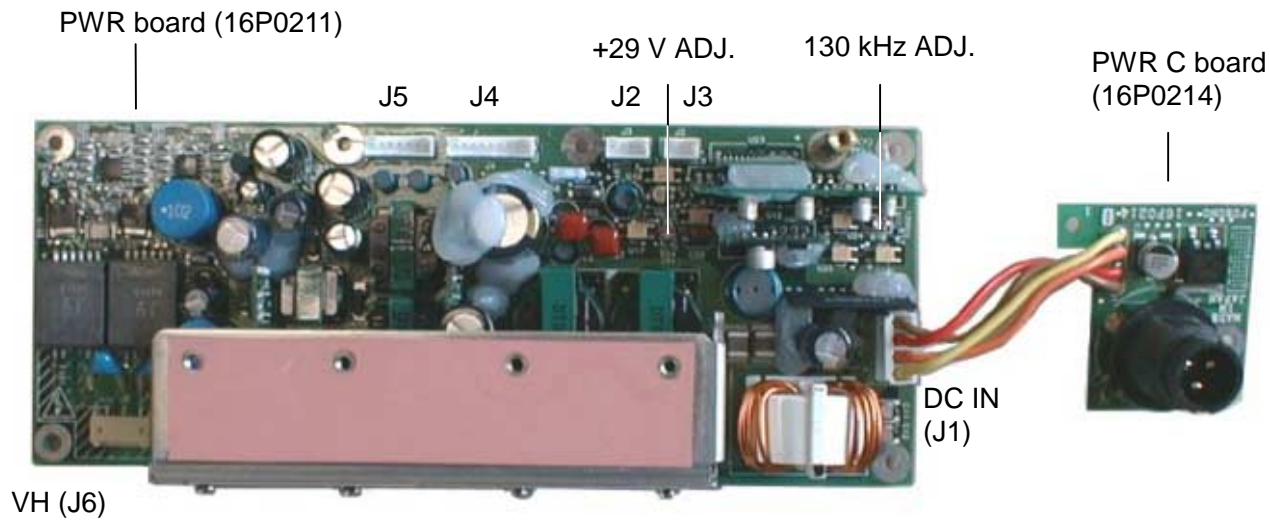


Fig.3.1.7 TERM CPU board (16P0209)



Pin No.	1	2	3	4	5	6	7	8	9
J3	29/7 V	29/7 V	GND	GND	-	-	-	-	-
J4	6.5 V	GND	3.3V	GND	HPA ON	GND	CHK V	ANT C	GND
J5	CFL CTRL	GND	5V	GND	3.3 V	GND	6.5 V	-	-

Fig.3.1.8 PWR board (16P0211) and PWR C board (16P0214)

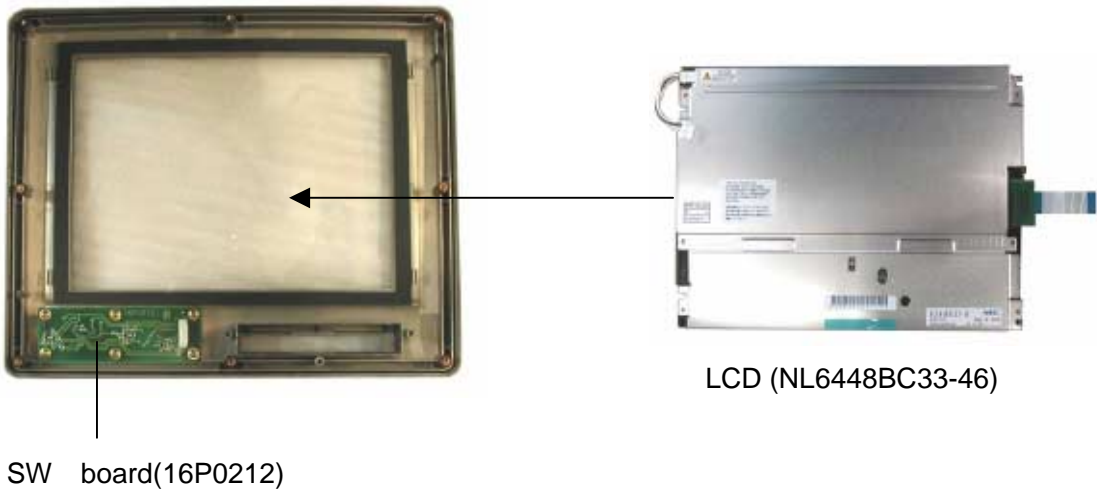
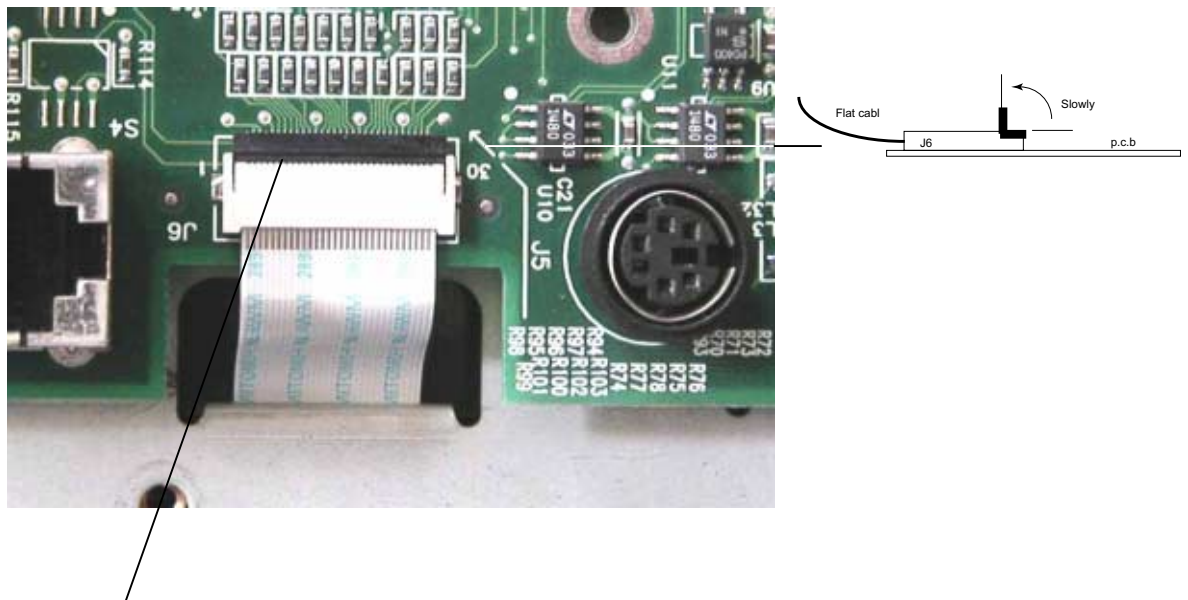


Fig.3.1.9 Panel with LCD removed

**** Handling flat cable connector *****Fig.3.1.10 Connector allocation***Note 1) Disconnecting flat cable from J6**

To disconnect the flat cable, gently, set the locking tab to vertical position and then pull out the cable from the connector. Excess force will damage the connector tab. To connect the cable, reverse the above procedure.

*Fig.3.1.11 Flat cable connector, J6*

Note 2) Disconnecting flat cable from J9

To disconnect the flat cable;

1. Release the locking tabs by pushing the tabs toward the cable. Excess force will damage the connector.
2. Pull out the cable.

To connect the cable, reverse the above procedure.

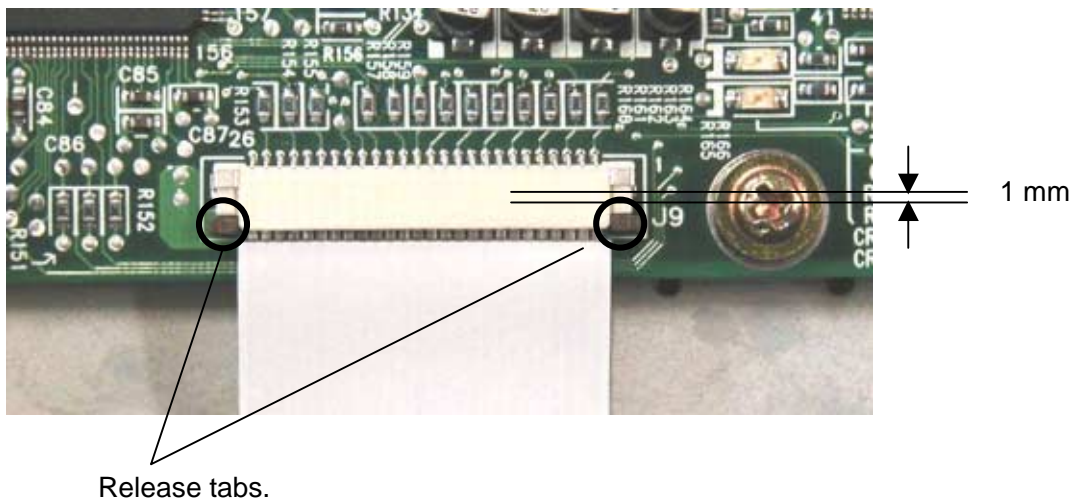


Fig.3.1.12 Flat cable connector, J9

Note 3) Disconnecting flat cable from FDD connector

To disconnect the flat cable;

1. Release the locking tabs by pushing the tabs toward the cable. Excess force will damage the connector.
2. Pull out the cable.

To connect the cable, reverse the above procedure.

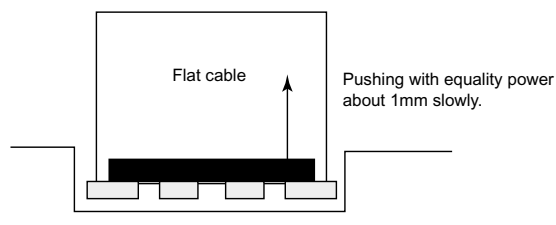
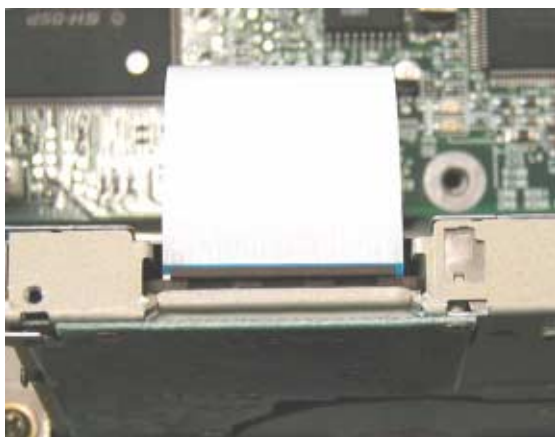


Fig.3.1.13 FDD connector

3.2 Antenna unit, IC-115



Fig.3.2.1 Antenna unit

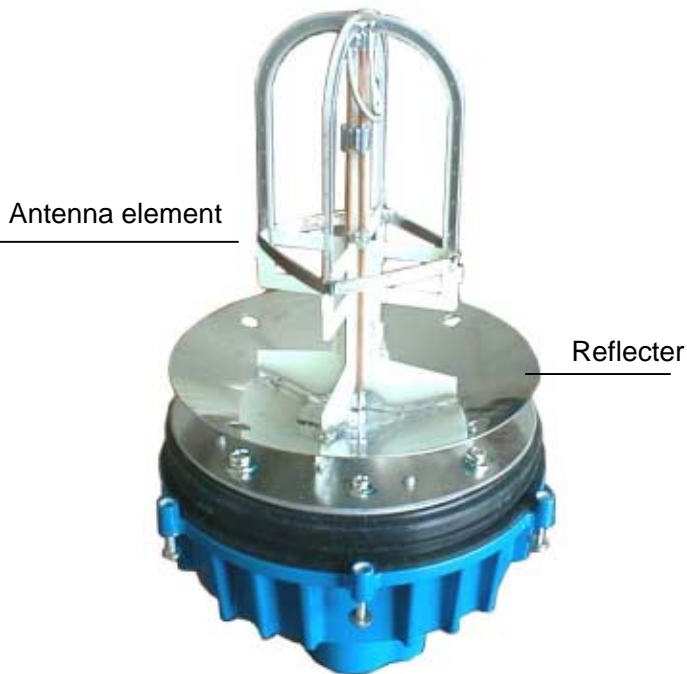


Fig.3.2.2 Antenna unit with cover removed

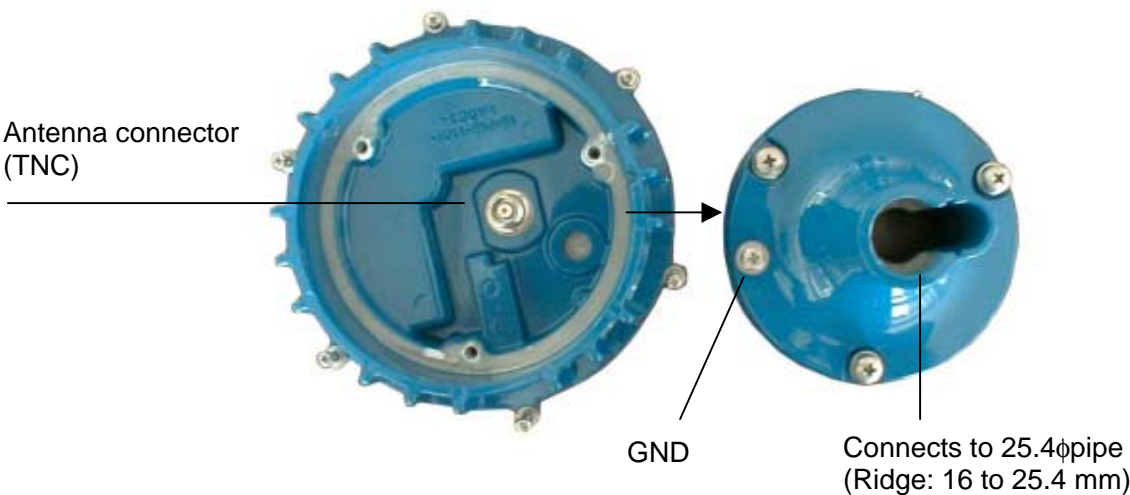


Fig.3.2.3 Antenna unit, bottom view

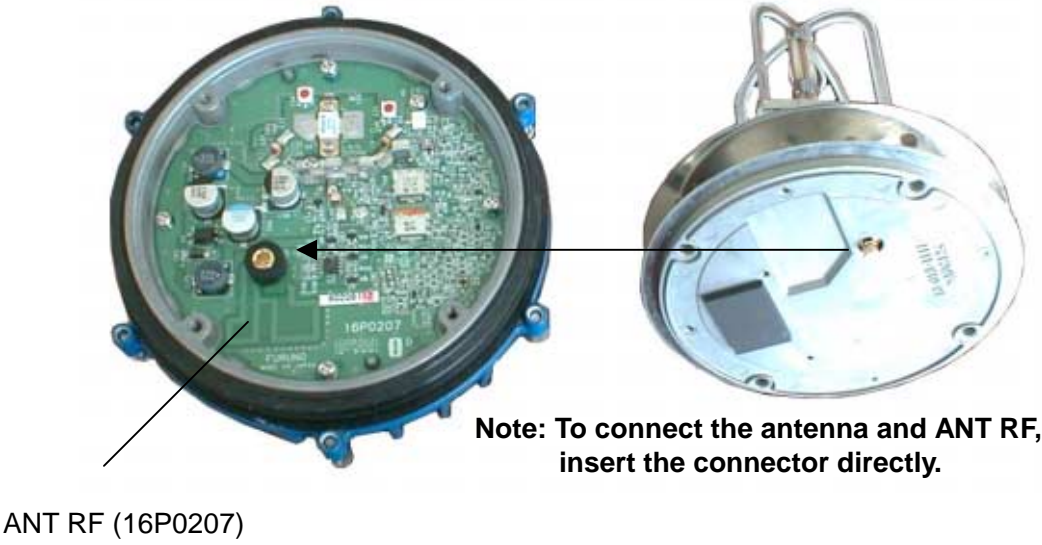


Fig.3.2.4 Antenna unit with antenna element removed

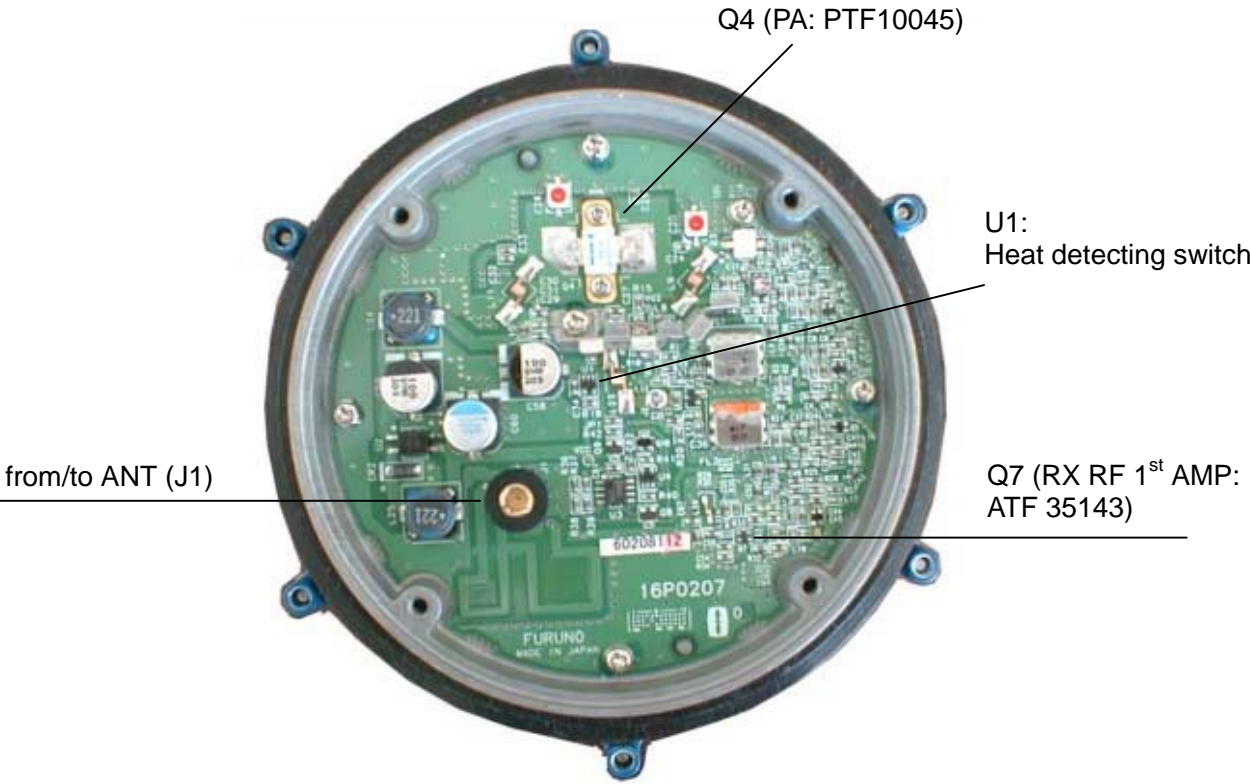


Fig.3.2.5 ANT RF board

3.3 Distress alert received unit, IC-305 and ALARM unit, IC-306



16P0213A

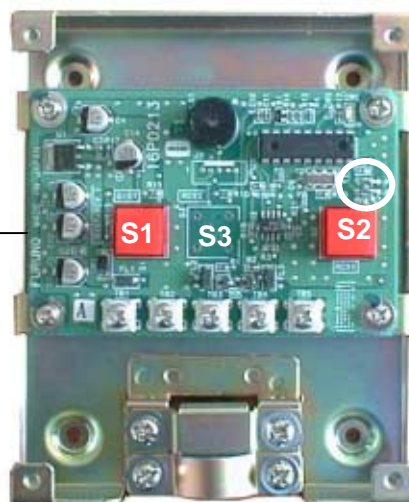
JP1: short
JP2: short

Fig.3.3.1 IC-305:Distress alert received unit

Fig.3.3.2 IC-305 with panel removed



16P0213B

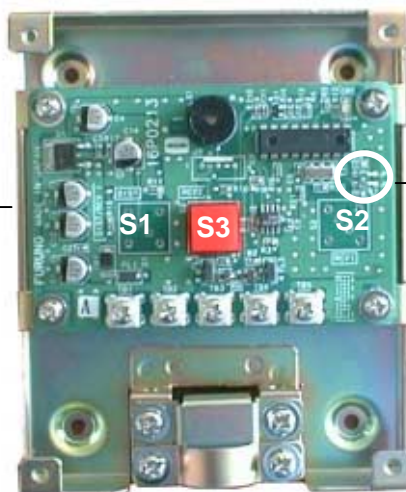
JP1
JP2

Fig.3.3.3 IC-306:ALARM unit

Fig.3.3.4 IC-306 with panel removed

Setting of JP1 and JP2 and installing S1, 2 and 3

16P0213 board has type A and type B. It differs from the jumper setting of JP1 and 2 and the presence of S1, S2 and S3.

Table 3.3.1 16P0213A and B

	A type	B type		
	DISTRESS	RCV-1	RCV-2	RCV-3
JP1	Short	Open	Open	Short
JP2	Short	Short	Open	Open
S1	YES	NO	NO	NO
S2	YES	NO	NO	NO
S3	NO	YES	YES	YES

3.4 Junction Box, IC-315 (Option)

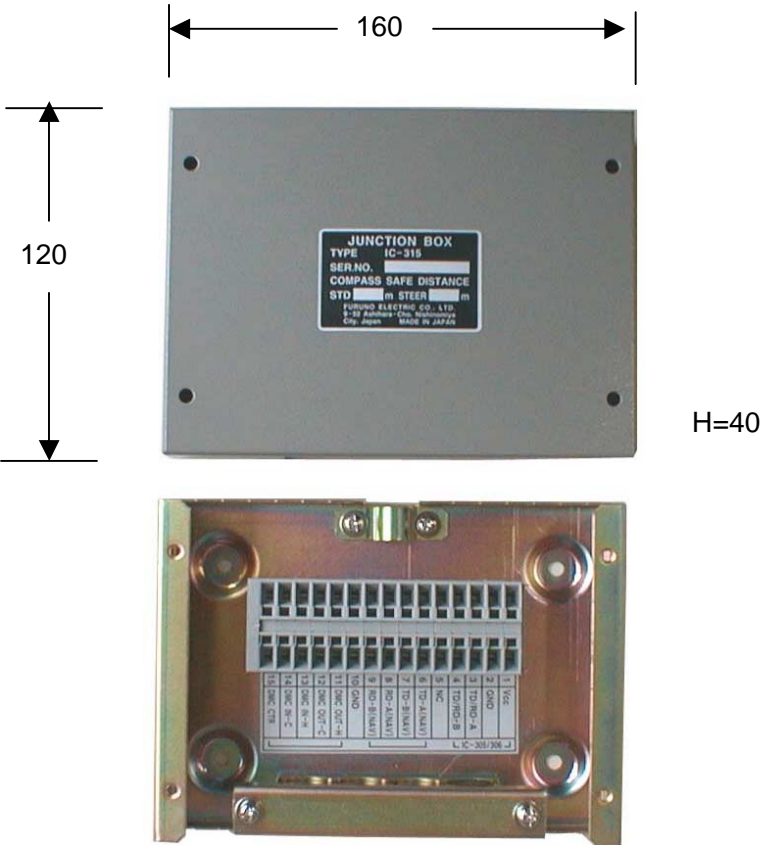


Fig.3.4.1 Junction box, IC-315

Table 3.4.1 IC-315 terminal number

Terminal number		Signal	Terminal number		Signal
1	IC-305/306	Vcc (ALM)	11	DMC	DMC OUT-H
2		GND	12		DMC OUT-C
3		TD/RD-A	13		DMC CHECK
4		TD/RD-B	14		DMC IN-C
5		N.C	15		DMC CTR
6	NAV	TD-A			
7		TD-B			
8		RD-A			
9		RD-B			
10		GND			

****The brightness adjustment of the display**

Press [F6] while holding [Alt] to decrease the brightness of the display at 8 levels.

To increase the brightness, press [F7] while holding [Alt].

4.1 System menu (F8)

4.1.1 Setting by DTE port

The terminal unit: PC which is connected to the DTE port of the Terminal unit: IC-215 shows the same display as the one of the IC-215. *Normally, The main system setting is made by the IC-215.* Table 4.1.1 lists the setting by the PC connected to DTE port.

Table 4.1.1 Setting by the DTE port

Setting		Note
[F8]-2. System Setup	IMN only	
[F8]-3. Editor Setup	All	
[F8]-4. Terminal Setup	All	
[F8]-6. Auto Mode Setup	All	
[F8]-7. Email Setup	All	
[F8]-8. Directories	All	
[F8]-9. Configuration	1. Station List	
	2. LES List	
	5. E-mail Service List	
	6. Save/Load	Following files are saved and loaded. See page 5-24. - Station.dat - LES.dat - Email.dat - DTE.dat (Except Network setup in [F8]-2 menu.)
[F10]:Alarm stop		For DTE port or IC-215

4.1.2 System menu (F8)

1. Distress Alert Setup: [F8]-1

Item	Contents	Description
LES ID	Select LES	LES which sends the distress alert is selected. The default is AOR-E(NCS:144). When the distress alert is released out of the selected ocean region, it is sent to the synchronized NCS. The explanation to the user is required. When the selected ocean region differs from the LES setting, the message, "Pre-set LES ID for DISTRESS ALERT is invalid in this ocean. Please input preferred LES ID in the menu [Distress Message Setup]" appears.
Update Time	00:00 to 23:59	The time when the position data is updated is used for the system's time.
Position	LAT/ LON	It is input automatically from NMEA data. The data is updated every time the data is input. The manual input has higher priority. The manual input data is saved for one hour.
Protocol	Maritime	The value is fixed to Maritime for maritime operation.
Nature	Undesignated to Piracy or Armed attack	When installing, the value should be set to "Undesignated".
Course	0 to 999	The data is input automatically from NMEA data. The sentence is VTG. <i>The manual input has higher priority. The manual input data is saved for one hour.</i>
Speed	0 to 99	The course data, 999 and the speed data, 99 are processed as invalid data at the coast station.

2. System Setup: [F8]-2

Item	Contents	Description
System Date & Time		The data is input automatically. The time data is calculated from the TDM frame signal, and the date data uses the data from ZDA. If there is no ZDA, the input date is used.
IMN	(Indication only)	The input IMN is displayed in the status display. To re-enter, type "IMN" while holding [Ctrl].
MES Operation Mode	INMARSAT C/ EGC	Normally, set to "INMARSAT-C". When set to INMARSAT C, the message communication and the EGC reception is available. When set to EGC, only EGC reception is available.

NAV Port	OFF/ EXT/ INT	<ul style="list-style-type: none"> - INT: Sets when the built-in GPS is installed (GN-79: option) - EXT: Sets when the external GPS is connected. Note that the alarm is released when the NMEA data is stopped. See page 2-15. - OFF: Inputs manually the position data from [F9]. Note that the alarm is released when the data is not updated every 4 hours.
Active Port	INT	The received message is output to the Terminal unit: IC-215 only.
	ALL	The transmission and the reception is available from the Terminal unit: IC-215, the PCs connected to DTE and LAN port.
Message Output Port	INT	Setting for the message output. Only valid when the setting of "Active Port" is ALL. <ul style="list-style-type: none"> - INT: Outputs to the Terminal unit: IC-215. - EXT: Outputs to DTE and LAN port. - INT+EXT: Outputs to the IC-215, DTE and LAN port. - AUTO: Outputs to the ports according to Sub Address. Note) Sub Address; IC-215 and LAN port: 000 DTE: 001
	EXT	
	INT+EXT	
	AUTO	
EGC Output Port	INT	Setting for the message output. Only valid when the setting of "Active Port" is ALL. <ul style="list-style-type: none"> - INT: Outputs to the Terminal unit: IC-215. - EXT: Outputs to DTE and LAN port. - INT+EXT: Outputs to the IC-215, DTE and LAN port.
	INT+EXT	
Network (See page AP4)	IP Address	Default setting: 172.31.16.1
	Subnet mask	Default setting: 255.255.0.0
	DHCP	With DHCP turned on, IP address and subnet mask are automatically assigned when a DHCP server resides on a LAN. The default DHCP setting is OFF.
	Gateway	Set gateway IP address when mail is sent from a PC on a different network through a router.
Mail Gateway (See page AP4)	SMTP Enable IP Address	Specify the IP address of the PC which is to be used to send and receive e-mail. A PC not specified cannot send e-mail but it can receive e-mail. If no IP address is specified, all PCs connected to the LAN can send and transmit e-mail.
	Send Limit Size	2,4,6,8,10,16,32KB
	Attach	UUENCODE; Using the default setting, mail (MIME encoded) sent from a PC in a network is encoded with UUENCODE. For Inmarsat C use UUENCODE.
		BINARY

Mail Gateway (See page AP4)	Delivery To	PC Mailer Server; When a mail server is installed on a LAN, received mail is forwarded to the mail server via the LAN.
	Server IP	(When Server is selected in Delivery To setting.)
	Address Mode	FIXED (When Server is selected in Delivery To setting.); Message is sent mail address specified in Mail Address.
		Auto (When Server is selected in Delivery To setting.); When the keyword (entered in Auto Delivery Keyword) is found in the text of a message, the message is sent to the address which appears after the keyword. If the keyword is not found the mail is delivered to "Mail Address."
	Mail Address	(When FIXED is selected in Address Mode setting.)
	Mail Address Keyword	(When Auto is selected in Address Mode setting.)
Command Window		Command for the direct access to RF CON/CPU board. JOB No.: NERASERVICE Password: Nera C

3. Editor Setup (Close the TEXT editor display.) : [F8]-3

Item	Contents	Description
Text Mode	Telex/Ascii	Setting for TEXT input character - Telex: Limits for the character used for ITA2 code. - Ascii: Limits for the character used for Ascii code. When transmitting, the text is changed to the selected code in the Transmit message display.
Edit Mode	Insert/Overwrite	Setting for the character for TEXT editing. - Insert: Inputs the character to the cursor position. - Overwrite: Overwrites the character at the cursor position.
Word Wrap	ON/ OFF	ON/OFF setting for Word Wrap of TEXT editing. When Word Wrap is set to ON, the word in the end of line is split to two parts. The latter half followed by a hyphen is jumped to the next line.
Line No.	ON/OFF	ON/OFF setting for TEXT line number.
Tab Wide	2/4/8Char	Tab setting for TEXT editor. Selects from 2, 4 or 8.
Column Width	Max 80	Setting for the character number per a line. When Text mode is set to Telex, the character number is fixed to 69. When set to Ascii, the character number is fixed to from 40 to 80.
Cursor Type	Block/ Underline	Setting for the cursor type. - Block: ■ - Underline: _
Scroll	Full/Half Screen	Setting for scrolling. - Full: The full of the display is moved up and down by [PgUp] and [PgDn]. - Half Screen: The half of the display is moved up and down by [PgUp] and [PgDn].

4. Terminal Setup: [F8]-4

Item	Contents	Description
Date Disp. Form	YY - MM - DD	Setting for the way of the data display such as the one in the status display and the time stamp for the Log menu.
	MMM - DD - YY	
	DD - MMM - YY	
Currency Unit	SDR to OTHER	Setting for the currency unit registered by the LES list. The communication rate is shown in the Transmit Message (F3-1).
Screen Saver	ON/OFF	ON/OFF setting for the Screen Saver. When it is set to ON, the screen saver appears if the system has not been used for 10 minutes.
Window Color	Window Color Setup	Setting for the window color.
	Default Color	Setting for the window color. Returns the color to the default.

5. EGC Setup: [F8]-5

Item	Contents	Description
Receive EGC Area	Additional Position	Area set by Pos.
	Navarea	Inputs Navarea
	Fixed Area	"Fixed Area" is where you enter fixed areas (max. 3) for chart correction service. However, this service is not yet available; enter no data.
	Way point	ON/ OFF setting for the WP area designated by the navigational system.
NAVTEX	Station Code	Selects NAVTEX station.
	Ice Report to QRU (no message)	ON/ OFF setting for the receiving message type.

6. Auto Mode Setup: [F8]-6

Item	Contents	Description
Auto Log Print	ON/OFF	When set to ON, Log is automatically printed out every time the date is changed.
Receive Alarm	ON /OFF	ON/ OFF setting for the message receiving alarm. When receiving the message, the alarm is released to IC-215 and the ALARM unit. All alarm is stopped by the operation of [F10]:STOP ALM of IC-215.

Auto Receive Message Save	ON/OFF	Setting for the automatic saving of the message.
Auto Receive Message Print	ON/OFF	Setting for the automatic printing of the message.
Data Report & Polling Print	ON/OFF	Setting for the printing of the data report and polling.
Auto EGC Message Save	System	Setting for the automatic saving according to the EGC message.
	Fleet NET	
	Safety NET (Rou.)	
	Safety NET (Saf.)	
	Safety NET (Urg./Dis.)	
Auto EGC Message Print	System	Setting for the automatic printing according to the EGC message.
	Fleet NET	When "Safety NET(Saf)" is set to OFF in "Auto EGC Message Save", "Safety NET(Saf.)" it is automatically set to ON.
	Safety NET (Rou.)	
	Safety NET (Saf.)	

7. Email Setup: [F8]-7

Item	Contents	Description
Select station		Setting for the LES. The LES for sending the E-mail is selected from "Email service list" made by [F8]-9-5.

8. Directories: [F8]-8

Item	Contents	Description
Message Directory	Select Directory	Setting for the directory which the received message is saved.
EGC Message Directory	Select Directory	How to set the directory. 1. Select the directory. 2. Press [↓]. 3. Press [Insert]. 4. Enter the directory name. 5. Press [Enter]. 6. Press [↑]. 7. Press [Enter] and then select the directory. 8. Press [ESC] to return the status display.

9. Configuration: [F8]-9

Item	Contents	Description
1. Station List (Max.99 stations)	Station Group	When registering the station more than two, the station is divided into groups by this setting. This function is available when the station for sending the message is selected by Transmit Message ([F3]-1).
	Station Name	Inputs the station name.
	Destination Type	Setting by which Destination Type the message is sent. Selects from TELEX to SPEC (Prefixed).
	Prefix code	Inputs when Prefix is selected from Destination Type.
	Country/Ocean Code	Registers the country or the ocean code of the station for sending the message.
	Station ID	Registers the station number of the station for sending the message.
	Modem Type	T30 (FAX) When Destination Type is set to FAX, select T30 (FAX).
	E-mail Address	Registers the E-mail address.
	Remark	Sets to Remark if necessary.
2. LES List (Max. 64 stations x 4)	Name	Registers LES name.
	ID	Registers LES number.
	Remark	Sets to Remark if necessary.
	Charge	Registers the communication charge of each Destination Type if necessary.
3. EGC channel List	Max. 4ch x 4	Registers the additional channel.
4. NCS Channel List	Max. 20ch x 4	
5. E-mail Service List (Max. 16 stations)	Service Station Name	Registers the LES name.
	Service ID	(Enter ID: max. 9 char.) EX) Comsat: INET, Station12: 400
	LES ID (AORW) to IOR	Registers the LES number of each service region.
	To:	Registers according to the header format of the LES.
	Cc:	
	Subject:	
	Separator	
	Attach File (MIME)	Setting which code is used when the attached file is sent. Code: OFF, BASE64 and <u>UUENCODE</u> When set to off, the attached file is not sent.
6. Save/Load	Save to FD	See page 5-24
	Load from FD	

4.2 Setting from Command Window

Followings are set by “Command Window” in [F8]-2: System menu;

- The ON/OFF setting of DMC-5, IC-305 and IC-306 unit
- The NMEA data transmitting cycle

When the alarm unit is installed, the jumper setting for this unit is also needed.
See page 4-11.

4.2.1 Remote Box Setup

When IC-305, IC-306 or DMC-5 are connected, Command Window ([F8]-2, system menu) controls the installation setting.

1. Select “Command window” ([F8]-2) and then press [Enter].

[Main Menu]

1. Remote Box Setup
 2. Internal GPS Setup

Enter JOB No.:

2. Open the service mode.

JOB NO.: Type “NERASERVICE” and [Enter]
 Password: Type “Nera C” and [Enter]

[Main Menu]

1. Remote Box Setup
 2. Internal GPS Setup

Enter JOB No.:

Reversed.

In Service mode, the [Main Menu] display is reversed.

3. Press [1] and then [Enter] to select “1. Remote Box Setup”. Start setting according to the installation.

[Remote Box Setup]

1. DMC OFF
 2. IC-305 OFF
 3. IC-306 No.1 OFF
 3. IC-306 No.2 OFF
 3. IC-306 No.3 OFF

E: Exit

Enter No.:

4. When “1. DMC” is installed, press [1] and then [Enter]. The ON/OFF setting display appears. Press [1] and then [Enter] to set the installation of DMC to ON.

[DMC]

1. ON
2. OFF E:Exit

Enter JOB No.:

5. Other remote units are set by following the same procedure.
6. To return to the status display, press [Esc].

4.2.2 Setting of Internal GPS transmitting cycle

The cycle of transmitting signal output from the internal GPS (Option) is set. The minimum of the sentence output cycle from Nera C is set up in 30 seconds from 1 with a bundle. Each sentence is output with the cycle of the house long one of the minimum cycle or default cycle that were set up. When “Data Output Interval” is set to 1 second, each sentence is output with the following cycle.

ZDA: 1s, GGA: 2s, RMC: 2s, GLL: 2s, VTG: 2 s, GSV: 10 s

1. Select “Command window” ([F8]-2) and then press [Enter].

[Main Menu]

1. Remote Box Setup
2. Internal GPS Setup

Enter JOB No.:

2. Open the service mode.

JOB NO.: Type “NERASERVICE” and [Enter]
Password: Type “Nera C” and [Enter]

[Main Menu]

1. Remote Box Setup
2. Internal GPS Setup

Enter JOB No.:

Reversed.



In Service mode, the [Main Menu] display are reversed.

3. Press [2] and then [Enter] to select “2. Internal GPS Setup”.

[Internal GPS Setup]

1. Data Output Interval 1 (sec)
E: Exit
Enter No.:

4. Press [1] and then [Enter]. “Data Output Interval” display appears for setting.

[Data Output Interval]

Interval (1) : 1 (01 - 30 sec)

5. To register the settings, press [Enter].
6. To return to the status display, press [Esc].

4.3 Jumper setting of IC-305 and 306

A maximum of 3 IC-306 unit is connected. The jumper setting of the 16P0213 board is required for recognition of each IC-305 unit. See table 4.3.1.

The 16P0213 board has two types, type A for the IC-305 unit and type B for the IC-306 unit. Each type is recognized by the jumper setting of JP1 and JP2 and the presence of S1, S2 and S3.

Table 4.3.1 Boards 16P0213A and 16P0213B

	A type (IC-305)	B type (IC-306)		
	DISTRESS	RCV-1	RCV-2	RCV-3
JP1	Short	Open	Short	Open
JP2	Short	Short	Open	Open
S1	Yes	No	No	No
S2	Yes	No	No	No
S3	No	Yes	Yes	Yes

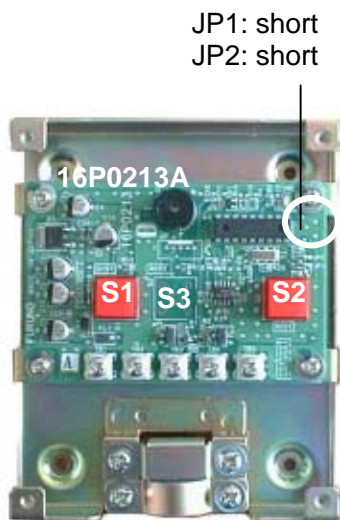


Fig.4.3.1 IC-305 (Distress Alert Received unit)

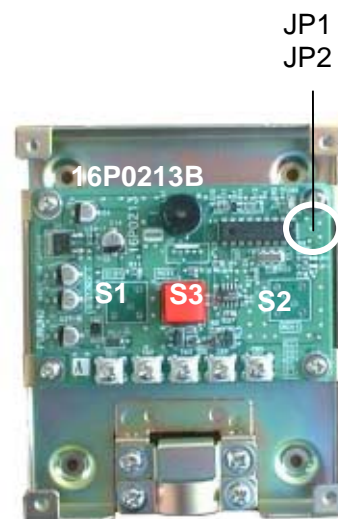
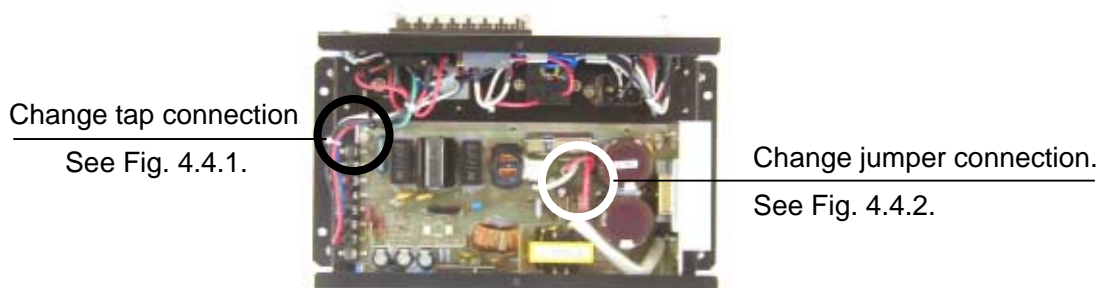


Fig.4.3.2 IC-306 (ALARM unit)

4.4 PR-240 power alteration

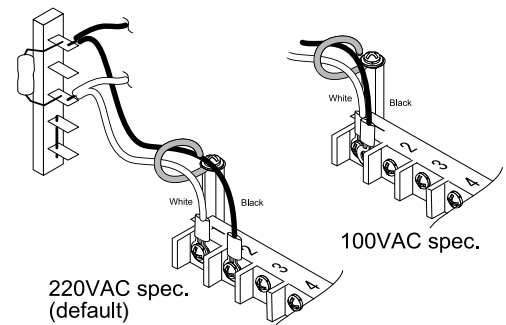
PR-240 is shipped for 220 VAC power connection. The power alteration between 230 V and 115 V is made as below without soldering.



Step 1. Changing tap connection

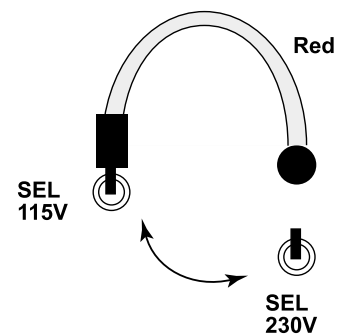


Fig. 4.4.1 Changing tap connection



The white wire is connected to #1 and the black #2 in 220 VAC sets. Both white and black wire are connected to #1 in 115 VAC sets.

Step 2. Changing jumper connection



Change the connection of red wire depending on ship's mains.

Fig. 4.4.2 Changing jumper connection

Chapter 5. Maintenance

5.1 PV (Performance Verification) test

PV test is for checking the MES function. The signal (message) is exchanged between MES and LES.

5.1.1 PV test sequence

1. Select PV test on the Test menu.
2. The MES requests NCS to conduct PV test.
3. The NCS acknowledges request for testing.
4. The MES, upon receiving acknowledgement from NCS, goes into pending state.
5. NCS select a (not busy) LES to perform the test.
6. The LES transmits a test message to the MES.
7. The MES transmits the test message to the designated LES.
8. Distress alert testing. The MES transmits the distress alert transmission test.
The distress alert is automatically transmitted within two minutes.
9. When the distress alert test is finished the results of the PV test are sent to MES.

5.1.2 Procedure

Before starting the PV test, check the following.

- 1) Log in to the system ?
- 2) The message below left of Current Status is “IDLE” ?
- 3) C/N is “OK” ?

Procedure

1. Press [F7/Option], [7] and then [1] to show PV Test start display.

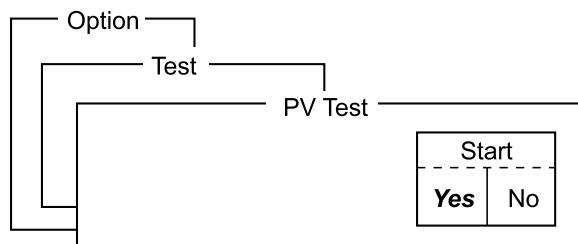


Fig.5.1.1 PV Test start Yes/No display

2. Select “Yes” and then press [Enter].

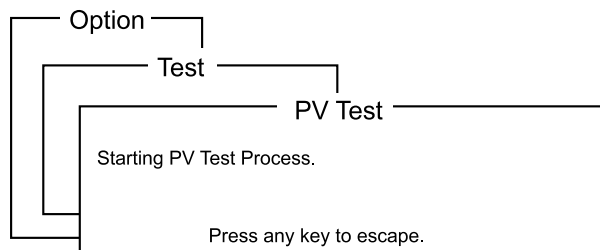


Fig.5.1.2 PV Test start display

3. PV test is started. To check the PV test progress, see Current Status or the message in the display.
 - 1) When NCS replays, “PENDING” appears on Current Status.
 - 2) When the test is automatically started, “TESTING” appears on Current Status.
 - 3) The message for the test is sent from LES to MES.
 - 4) The message for the test is sent from MES to LES.
 - 5) The distress alert test is started automatically two minutes later.
 - 6) The PV test result information is sent from LES to MES.
4. After finishing the test, “IDLE” appears on Current Status.
5. Check the PV test result.

Checking PV test result

To check the test result, press [F7/Option], [7] and then [2]. To print out the test result, press [P] while holding [Ctrl].

PV Test Result	

Ctrl + P : Print ESC : Quit	

Test Date & Time	02-01-01 01:00 (UTC)

Attempts	First attempt
BBER	Pass
Shore - to - Ship Attempts	First attempt
Ship - to - Shore Attempts	First attempt
Distress Alert	Pass (Test OK)
Signal strength	Pass (Greater than Std level + 6dB)

Overall Result	Pass (Applicable tests pass)

Fig.5.1.3 PV Test result display

- Test Date & Time: Displays the date and the time of PV test.
- Attempts: Displays how many times PV test is tried after the last PV test is succeeded.
- BBER: Bulletin Board Error Rate. When the error rate is low, “Pass” appears. When it is high, “Fail” appears.
- Shore to Ship Attempts: Number of tests initiated by LES
Display example: First attempt, Second attempt, Third attempt, Third attempt failed
- Ship to Shore Attempts: Number of tests initiated by MES
Display example: First attempt, Second attempt, Third attempt, Third attempt failed
- Distress Alert: When the distress alert test is OK, “Pass” appears.
Pass: Not Applicable, Test OK, Nature of Distress: not Default, Null Data, Automatically Activated
Fail: No Response, Incorrect Protocol, Invalid Data Format
- Signal Strength: When the signal strength of the signal from MES which is received by LES is within the tolerance, “Pass” appears.
Pass: Less than Std. Level, Greater than or equal to Std. Level, Greater than Std level +3, +6, +10, +13, +16dB
Fail: No response, unreadable

- Overall Result: When the PV test result is pass, “Pass” appears.

Pass: Applicable tests pass

Fail: Forward message transfer fail, Return message transfer fail, Signal unreadable, Signal level excessive, Distress alert test fail, Unspecified fail

5.2 Self test

The self test is started from the function menu or when the system is turned on. When detecting the system trouble, the message followed by “TROUBLE:” appears.

5.2.1 Self test when the system is turned on

The test listed in table 5.2.1 is automatically started. When detecting “NG”, change the tested board.

Table 5.2.1 Test when the system is turned on

Parts to be tested		Test content	Display when detecting error
RF CON/CPU board	U22	SRAM Read/Write check	TROUBLE: RFCON CPU RAM NG.
	U14	Read/Write check of CPU built-in ROM	TROUBLE: RFCON CPU ROM NG.

5.2.2 Self test from function menu

1. Press [F7/Option], [7] and then [3] to show the self test start display.

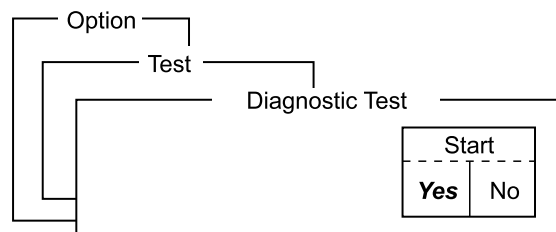


Fig.5.2.1 Self Test start Yes/No display

2. Select “Yes” and then press [Enter]. When the test is started, “Now testing” appears.
3. Fig.5.2.2 shows the display when the test is finished.

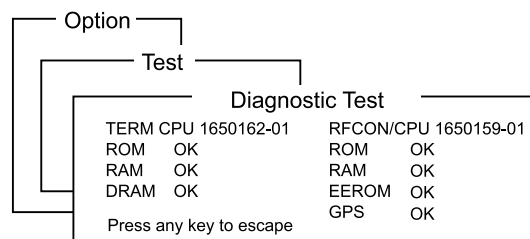


Fig.5.2.2 Test result display

Note: When the optional GPS board is not installed in terminal unit(IC-215),
 “***” appears on the result of the GPS test.

4. Press [Esc] to return the status monitor display.

5.2.3 TROUBLE message

Table 5.2.2 lists the trouble message.

Table 5.2.2 TROUBLE message

Message	Description	Work to be required
TROUBLE: RFCON CPU ROM NG.	When detecting the error of CPU ROM on RF CON/CPU board. This error occurs when the self test is started from the function menu or by turning on the system.	Changes RF CON/CPU board.
TROUBLE: RFCON CPU RAM NG.	When detecting the error of RAM on RF CON/CPU board. This error occurs when the self test is started from the function menu or by turning on the system.	
TROUBLE: RFCON CPU EEPROM NG.	When detecting the error of EEPROM on RF CON/CPU board. This error occurs when the writing of ID, DNID, ENID and [F8]-1, and [F8]-2 is started. And when the self test is started from the function menu.	1. Changes EEPROM. 2. Changes RF CON/CPU board.
TROUBLE: Synthesizer UNLOCK.	When detecting the unlock of the PLL synthesizer circuit on RF CON/CPU board.	Changes RF CON/CPU board.
TROUBLE: ANT power voltage abnormality.	When detecting the antenna supplied voltage (Tx29V/Rx7V) is not the ratings.	1. Checks the antenna coaxial cable. 2. Changes the antenna unit. 3. Changes PWR board.
TROUBLE: ALARM unit Fault.	When detecting the communication error between IC-306 and RF CON/CPU board.	1. Checks the wiring. 2. Changes IC-306. 3. Changes RF CON/CPU board. 4. Changes TERM CPU board.
TROUBLE: DMC connection abnormality.	When detecting the communication error between DMC-5 and RF CON/ CPU board.	1. Checks the wiring. 2. Checks DMC-5. 3. Changes RF CON/CPU board. 4. Changes TERM CPU board.
TROUBLE: DISTRESS ALERT UNIT Fault.	When detecting the communication error between IC-305 and TERM CPU board.	1. Checks the wiring. 2. Changes IC-305. 3. Changes RF CON/CPU board. 4. Changes TERM CPU board.
TROUBLE: Carrier power level.	TX current could not be detected by PWR board at transmission, that is no transmission. (Actually, no appears)	1. Changes IC-115. 2. Changes RF CON/CPU board. 3. Changes PWR board.

TROUBLE: EEPROM ERROR.	When detecting the error of EEPROM (U15) on RF CON/CPU board.	1. Changes EEPROM (U15). 2. Changes RF CON/CPU board.
TROUBLE: Invalid MES ID, This equipment is defected. Please contact Nera SatCom.	When the FW/RT ID memorized to EEPROM (U15) on RF CON/CPU board is deleted.	Changes EEPROM (U15).

Note)

MES ID (Forward ID and Return ID) is memorized to EEPROM (U15) on RF CON/CPU board. The serial number is needed when ordering the EEPROM for the ship.

5.3 Status monitor

5.3.1 Items on the status monitor

Fig.5.3.1 shows the status monitor display.

File	Edit	Transmit	EGC	Reports	Logs	Options	Setup	Position	StopAlarm
<hr/>									
Date			02-10-01			BBER		IMN : 443156710	
Time			06:12 (UTC)			C/N		000	
						Send Level		OK (38 dB)	
Position			LAT 35:00.00N			Rx AGC Level		OK (0)	
			LON 135:00.00E			REF Offset Freq		OK (133)	
Waypoint			LAT			Synthe Local		OK (0 Hz)	
			LON					OK	
Course			321.1 DEG						
Speed			10.1 KTS						
Current NCS			344 (IOR) LOGIN			Antena Power Supply		OK	
Current Channel			LES TDM						
Current TDM			LES TDM			Water Temereature		23.4 DEG	
MES Status			Busy			Water Current			
GPS Status			3D			Direction		123.4 DEG	
						Speed		2.0 KTS	
DCE Memory			32812 Bytes free			Depth		123.4 FT	
<hr/>									
Current Status : TESTING				SYNC (LES)		02 - 01 - 01 06:12 (UTC)			
TESTING -- RECEIVING MESSAGE				NCS :IOR LOGIN		LAT : 35:00.00N			
DCE F15 Ver. 0x						LON :135:00.00E			

Fig.5.3.1 Status monitor display

- Date: Current date
- Time: The time calculated from the frame number of NCS TDM.
- Position: Position data of own ship (either manual entry or automatic input by navigation aid)
- Waypoint: The destination position data from the external navigational system. (WPL)
- Course: Head direction (VTG)
- Speed: Ship speed (VTG)
- Current NCS: NCS of the current receiving ocean region.
- Current Channel: The current used channel. (such as NCS common channel, MES message channel etc)

- Current TDM: TDM type (NCS common TDM or LES TDM)
- MES Status: Busy or Idle
- GPS Status:

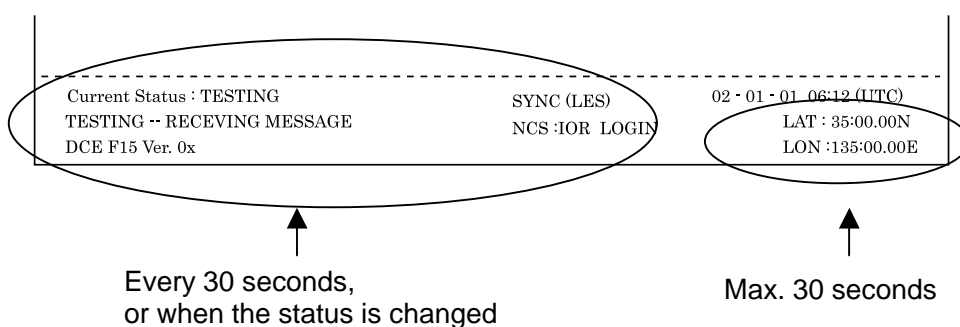
When GGA sentence is input from the external GPS, the status of the external GPS is displayed as follows.

 - CST (Cold Start): Calculates without the almanac data.
 - ACQ (Acquired): Acquires the almanac data.
 - IMP (Impossible): The reception is not available.
 - INT (Interrupted): The interruption occurs during GPS reception.
 - ALM: Receives the almanac data.
 - 2D/3D: Positioning in two or three dimensions
- DCE memory: The empty volume of the memory of the S-RAM in RF CON/CPU board.
- BBER: Bulletin Board Error Rate (%)
- C/N (Carrier/Noise): The quality of the received signal. “OK” appears when it is more than 31dB.
- Send Level: Checks the transmission level. “OK” appears when it is more than 123 for transmitting, less than 32 for receiving.
(Normally, 0 appears for receiving, 255 for transmitting.)
- Rx AGC Level: Checks RX circuit. “OK” appears when the level is more than 60.
When the value is near 255, the receiving signal is not input to RF CON/CPU board from the antenna unit. U14 (CPU) on RF CON/CPU board generates AGC voltage to control pin diodes, CR31 and CR32 based on BPSK modulated I- and Q-signals.
- REF Offset Freq.: The difference between the RX frequency and the internal oscillation frequency. “OK” appears when the Offset Freq. is less than 150 Hz.
- Synthe Local: Checks of PLL synthesizer circuit on RF CON/CPU board.
- Antenna Power Supply: “NG” appears when the antenna cable is disconnected or short.
- Water Temperature: MTW
- Water Current
 - Direction: Direction of the tide (VDR) Depth: Depth of water (DBT)
 - Speed: Speed of the tide (VDR)

Note) Refer 5.3.2 for the underlined item.

Table 5.3.1 Update timing of each item in status display

Item	Every 30 seconds	Every 30 seconds, or when the status is changed	Every 5 seconds
Date			
Time			
Position	O(Max. 30 sec)		
Waypoint	O		
Course	O		
Speed	O		
Current NCS		O	
Current Channel		O	
Current TDM		O	
MES Status		O	
GPS Status		O	
DCE memory		O	
BBER			O
C/N			O
Send Level			O
Rx AGC Level			O
REF Offset Freq.			O
Synthe Local			O
Antenna Power Supply			O
Water Temperature	O		
Water Current	O		
Depth	O		

*Fig. 5.3.2 Update timing of each item in bottom of status display*

5.3.2 NG analysis

BBER

When the receiving error rate of the bulletin board which is on the top of TDM channel is over 80%, the message, “WARNING: BBER over 80%. SCANNING NCS start manually” appears. Check the RX circuit on RF CON/CPU board.

C/N

“NG” appears when the RX signal is weak. The BPSK modulated I signal and Q signal at RF CON/CPU board is input to U14 (CPU) to output C/N data. When the C/N level of the RX signal is more than 31dB, “OK” appears. The followings are the parts which the error may be occurred;

- Antenna unit
- Antenna coaxial cable
- Coaxial connector
- RX circuit on the RF CON/CPU board
- Antenna blocking

Send Level

The send level detects the current supplied to the antenna unit and displays as the send level. PWR board detects the send level. Normally, the value is fixed to “0” when receiving and “255” when sending.

**When the log-in;

When the receiving is normal, the error occurred at the transmission part of the antenna unit or RF CON/CPU board, results in the login failure, and then following message appears.

- Too many retries.
- MES Signalling Failure, Login Request not sent to NCS.
- Login failed.

The followings are the parts which the error may be occurred;

- Antenna unit
- RF CON/CPU board
- PWR board

Antenna Power Supply

It is detected from the voltage, TX 29 V/RX 7 V supplied to the antenna unit. This voltage is divided at R97, R98 and R99 on the PWR board, and the Check V signal is sent to RF CON/CPU board. When the voltage is out of the ratings for transmitting and receiving, “NG” appears. The followings are the parts which the error may be occurred;

- Antenna coaxial cable
- Antenna unit
- PWR board

Rx AGC Level

The BPSK modulated I signal and Q signal at RF CON/CPU board is input to U14 (CPU) to output C/N data. RF CON/CPU board outputs the AGC voltage (Reverse AGC) based on the I signal and Q signal. The circuit to be controlled is the pin diodes of CR31 and CR32. “OK” appears when the level is more than 60.

When the value is near 255, the receiving signal is not input to RF CON/CPU board from the antenna unit.

The followings are the parts which the error may be occurred;

- Antenna unit
- RF CON/CPU board.

REF Offset Freq.

The error rate is increased when the RX frequency from the satellite differs from the carrier frequency input to the mixing circuit. This is the correction value of the carrier frequency input to mixing circuit. RF CON/CPU board detects the frequency difference to the RX frequency and the phase difference between I signal and Q signal. These data are fed back as DDS data. DDS output is the reference frequency of the PLL synthesizer circuit. PLL synthesizer output frequency is changed by controlling this frequency to match to the RX frequency.

“OK” appears when the Offset Freq. is less than 150 Hz.

Synthe Local

RF CON/CPU board monitors the PLL unlock signal, U20 of the PLL synthesizer circuit. The error may be occurred;

- RF CON/CPU board.

5.4 Checking BPSK waveform

To check the strength of the RX signal and the synchronization status, the Lissajous waveform which is the CPU processed BPSK signal is observed. For example, the disconnection of the antenna coaxial cable connector is found out by observing the waveform.

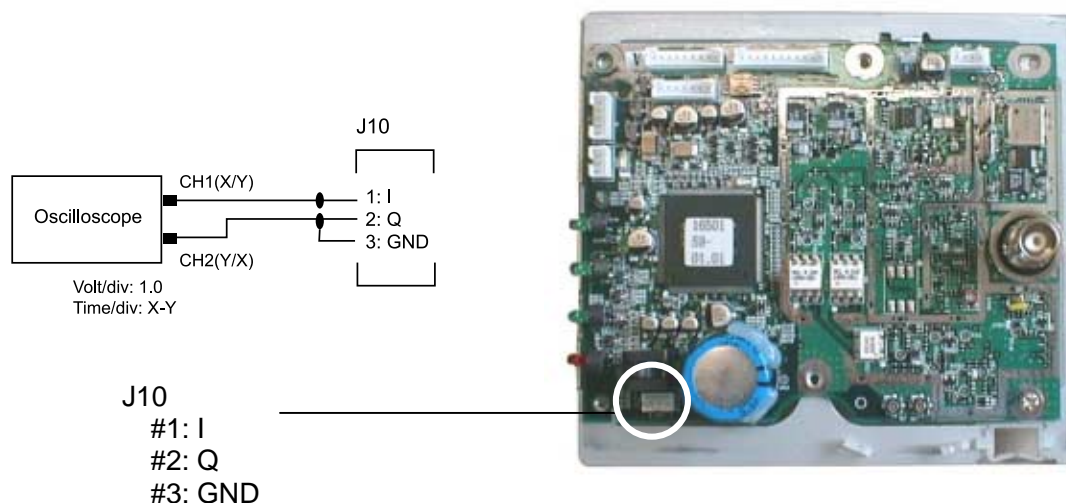


Fig.5.4.1 RF CON/CPU board

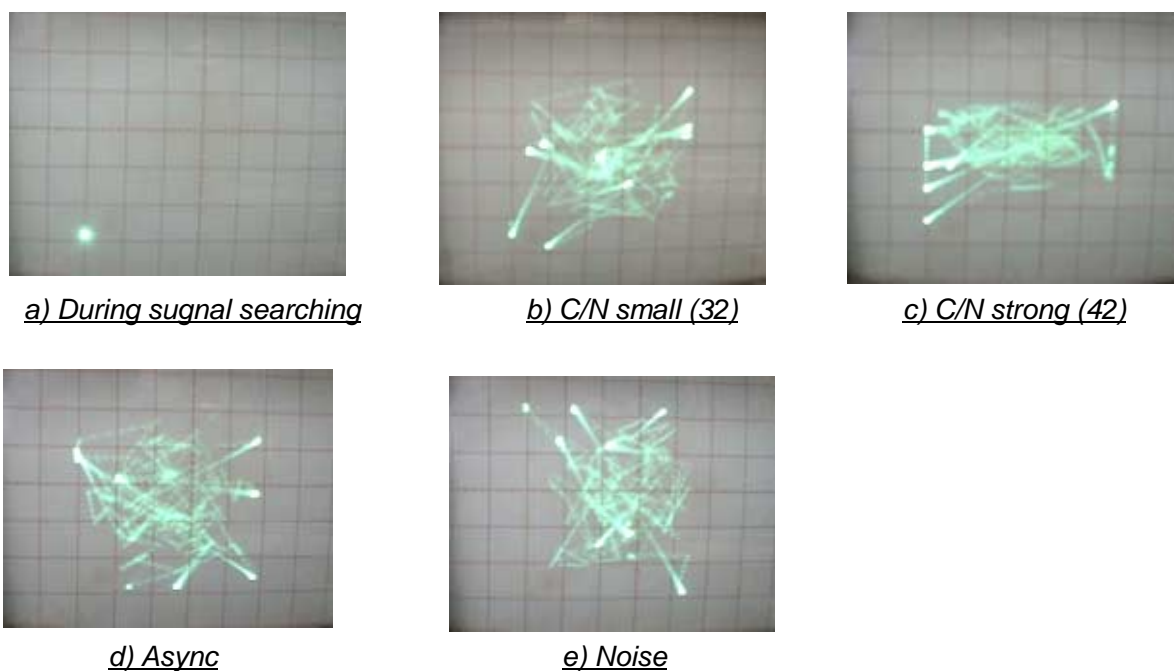


Fig.5.4.2 Processed BPSK waveform

5.5 LED

5.5.1 IC-215

Fig.5.5.1 shows the LED on RF CON/CPU board.

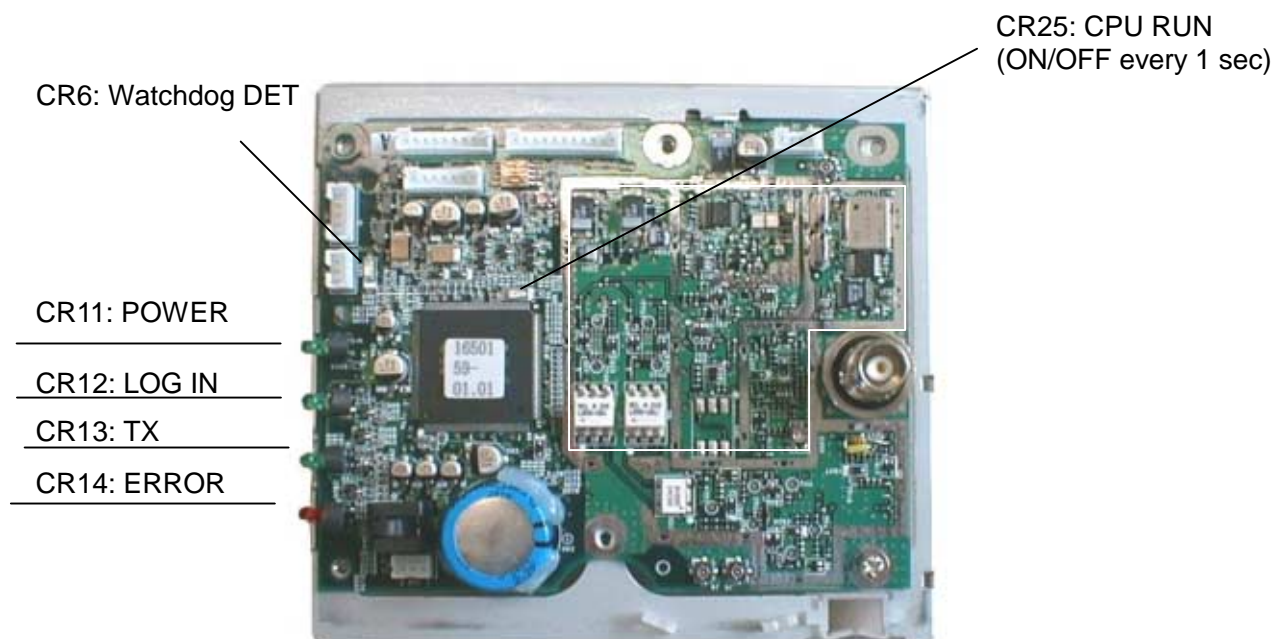


Fig.5.5.1 LED on RF CON/CPU board (16P0208A)

Table 5.5.1 LED Function

LED No.	Function	Status
CR6	Detecting Watchdog	ON: When detecting error. OFF: Normal
CR11	Displaying Power ON/OFF	ON: When turning on the system.
CR12	Displaying Log in	- ON: When MES is login mode. - Blinking: When MES is during logout mode and synchronized to TDM signal.
CR13	Displaying TX	ON: During the transmission.
CR14	Displaying Error detection	ON: When detecting the error of ROM, RAM, EEPROM, SYN, ANT-C and CHK-V.
CR25	Displaying RF COM/CPU RUN	Blinks every 1 second when RFCON/CPU board is worked.

Fig.5.5.2 shows the LED on TERM CPU board (16P0209).

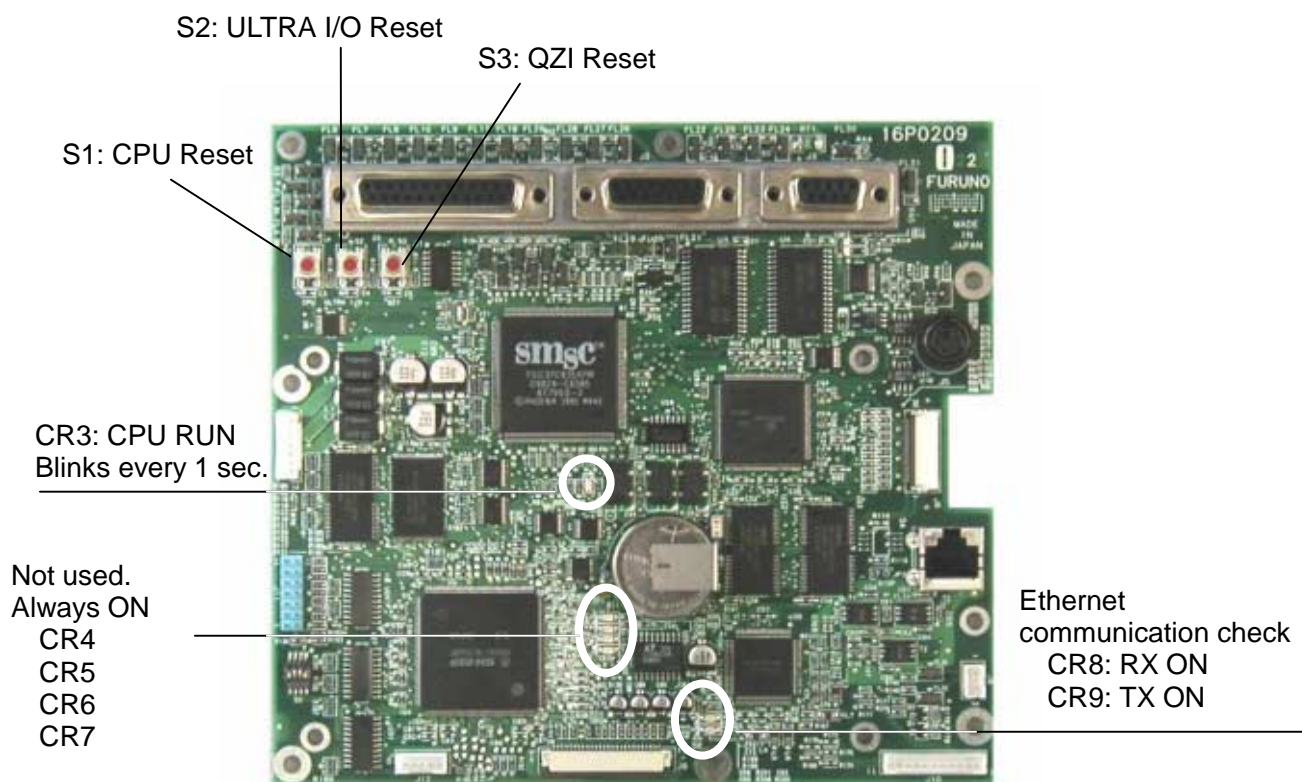


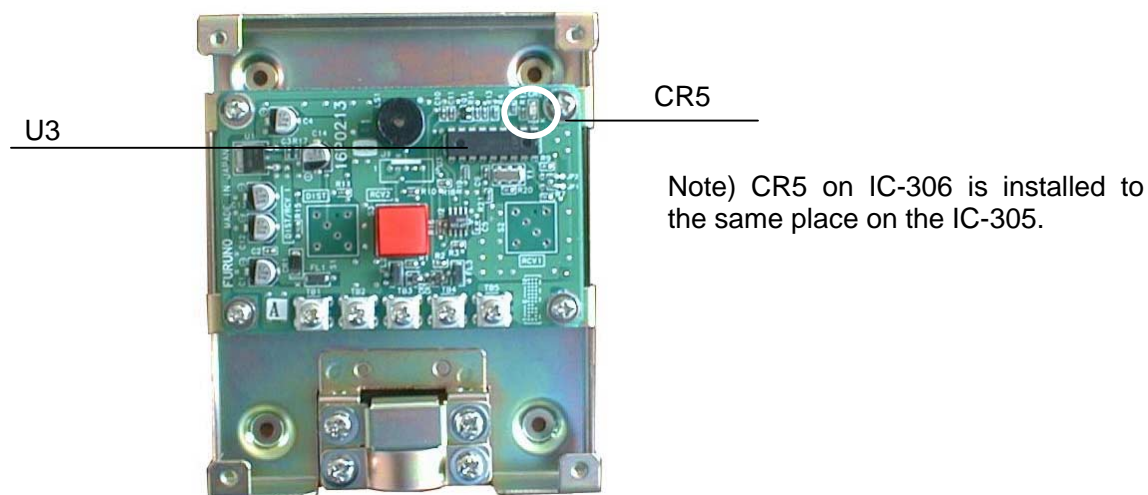
Fig.5.5.2 LED on TERM CPU board (16P0209)

Table 5.5.2 LED function

LED No.	Function	Status
CR3	Displaying TERM CPU RUN	Blinks every 1 second when CPU board is worked.
CR4	Not used	Always ON
CR5	Not used	Always ON
CR6	Not used	Always ON
CR7	Not used	Always ON
CR8	Displaying Ethernet communication check	On when receiving.
CR9		On when transmitting.

5.5.2 IC-305, 306

Fig. 5.5.3 shows the LED on IC-306 board.



Note) CR5 on IC-306 is installed to the same place on the IC-305.

Fig.5.5.3 LED on IC-306 board

Unit	LED No.	Function	Status
IC-305	CR5	Checking of U3.	Blinks every 1 second when no error is detected.
IC-306			

Note)

- 1) When the ACK button of IC-305 board is pressed, ACK LED is on and the buzzer is released.
- 2) **NEVER press the distress alert button.** The distress alert test is started by “Distress Alert Button Test” ([F7]-7-4). Before the test, the antenna should be disconnected.
- 3) When the button on IC-306 is pressed, LED is on and the buzzer is released.

5.6 DIP switch and Reset switch on IC-215

Fig.5.6.1 and Fig.5.6.2 show the switches on the RF CON/CPU board and TERM CPU board.



Fig.5.6.1 Dip Switch on RFCON/CPU board

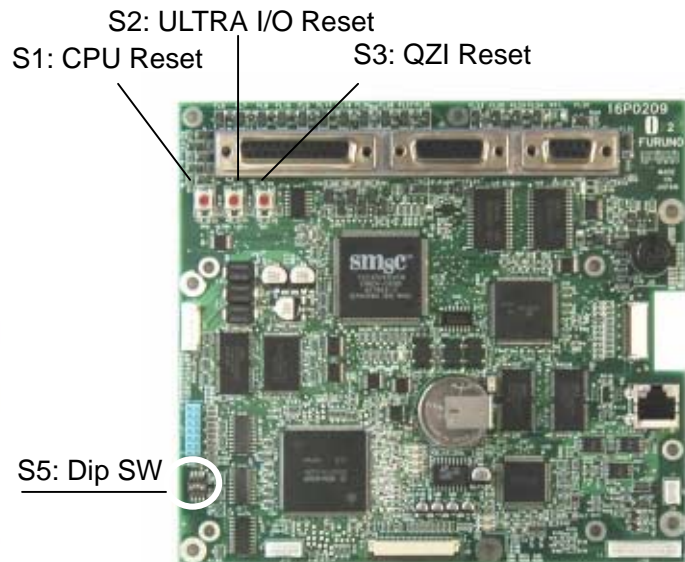


Fig.5.6.2 Switches on TERM CPU board

Table 5.6.1 lists the function of DIP switch.

Table 5.6.1 Function of DIP switch

Board	S1	Factory default	Function
RFCON/CPU (S1)	#1	OFF	For factory adjustment (For writing the boot program.)
	#2	OFF	Not used
	#3	OFF	
	#4	OFF	For factory adjustment
TERM CPU (S5)	#1	OFF	Not used
	#2	OFF	For factory adjustment
	#3	OFF	(For the check for ALM function)
	#4	OFF	Not used

Table 5.6.2 lists the function of the reset switch on the TERM CPU board. No need to work for these switches.

Table 5.6.2 Function of Reset switch

Switch	Action
S1: CPU Reset	Reset switch for CPU (U28). Same as the power-on and off.
S2: ULTRA I/O Reset	Reset switch for ULTRA I/O (U7). (I/O action remains stopping.)
S3: QZI Reset	Reset switch of QZ1(U21) for controlling LCD.

5.7 Checking LES Information

LES information is downloaded from NCS automatically at the log in and displayed to “LES Information” ([F7]-6).

1. Press [F7][6] and then [Enter] to select “LES Information”.
2. LES Information below appears.

LES Information				
LES ID	Name	Status	Services	TDM ch.
201	xxxxxxx	11111000	AS-----EL	12345
202		(B8 ~ B1)		
203				
207				
210				
211				
212				

LES ID: LES number

Name: Displays the LES name registered from LES List ([F8]-9-2). Displays blank when the name is not registered.

Status: See the table below.

Table5.7.1 Status

Bit No.	Status	Flag	Description
B8	Return link speed	1	600 bps
		0	300 bps
B7	Operational or spare satellite operation	1	Operational
		0	spare
B6	LES Status	1	In service
		0	Out of service
B5	LES Status	1	clear
		0	congested
B4	Used only by land earth stations	1	Terrestrial links open
		0	Terrestrial links closed
B3-1	spare	0	

Services: Displays LES service by the character when the bit is 1.

Table 5.7.2 Service

Bit No.	Flag	Description	Display
1B8	1	Maritime distress alerting	A
	0	No Maritime distress alerting	Not displayed
1B7	1	SafetyNET traffic	S
	0	No SafetyNET traffic	Not displayed
1B6	1	Inmarsat-C traffic	C
	0	No Inmarsat-C traffic	Not displayed
1B5	1	Store and Forward	T
	0	No Store and Forward	Not displayed
1B4	1	Half duplex	H
	0	No Half duplex	Not displayed
1B2	1	Full duplex	D
	0	No Full duplex	Not displayed
1B2	1	Closed network	N
	0	No Closed network	Not displayed
1B1	1	FleetNET traffic	F
	0	No FleetNET traffic	Not displayed
2B8	1	Prefixed store and forward message supported	P
	0	Prefixed store and forward message not supported	Not displayed
2B7	1	Land mobile alerting	Not used
	0	No Land mobile alerting	
2B6	1	Aero-C service supported	
	0	Aero-C not service supported	
2B5	1	ITA2 transmission supported	I
	0	ITA2 transmission not supported	Not displayed
2B4	1	Data transmission supported	B
	0	Data transmission not supported	Not displayed
2B2	1	Basic X.400 supported	X
	0	Basic X.400 not supported	Not displayed
2B2	1	Enhanced X.400 supported	E
	0	Enhanced X.400 not supported	Not displayed
2B1	1	Low power C MES supported	L
	0	Low power C MES not supported	Not displayed

TDM ch.: Displays TDM channel used by LES for transmitting.

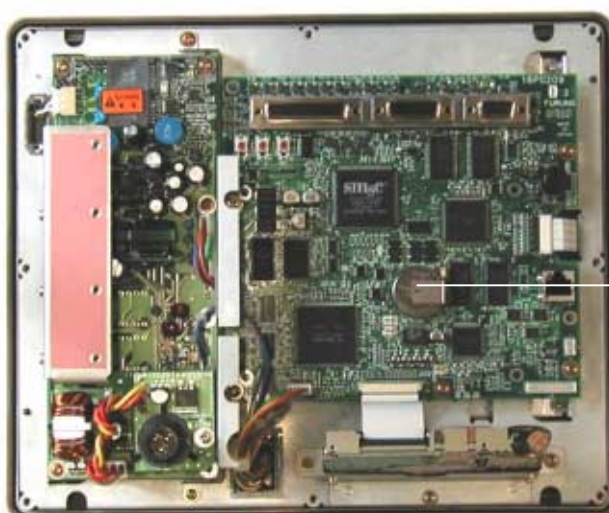
5.8 Changing Back-up battery on TERM CPU board



CAUTION!

Take care to avoid short-circuit of the battery. This could create a burn or fire hazard. Do not dispose of battery in a fire or an incinerator; this may cause an explosion!

Type of lithium battery: CR2450-F2ST2L
Code number: 000-144-941



Backup BATT

Fig.5.8.1 TERM CPU board

When the communication log is erased by power-on and off, the back-up battery should be replaced. The life of the battery is about five years.

Procedure

1. Remove TERM CPU board.
2. Remove JP1 (Back-up line) and then replace the battery.
3. Re-set JP1 and TERM CPU board and then turn on the system while holding [DEL] to start the memory clear. The normal window is displayed and the buzzer is released 3 times every 1 second.

5.9 Clearing Memory

The memory clear is required when the battery on TERM CPU board is replaced or the error is occurred.

Note)

The contents of S-RAM, U3 and U4 on TERM CPU board is deleted.
See page 2-27 for the memory contents.

Procedure

1. Turn on the system while holding [DEL].
2. The normal window is displayed and the buzzer is released 3 times every 1 second.

5.10 Distress alert test

Before starting the test, disconnect the antenna connector.

The test is made without transmitting “DISTRESS” of the terminal unit, IC-305 and DMC-5.

Note)

- When IC-305 and DMC-5 settings of “Remote Box Setup” in “Command Wind” ([F8]-2: System Setup) are not ON, the test is invalid.
- DMC-5 is set only to SES.

1. Open “Diagnostic Test” (keystroke:[F7][7][4]).

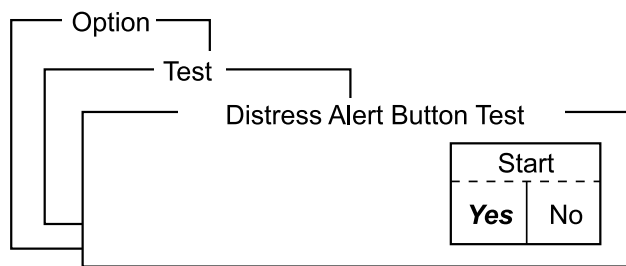


Fig. 5.10.1 Test Start display

2. Press [Enter]. The alarm is sounded repeatedly from the main unit and IC-305. Displays below appear.

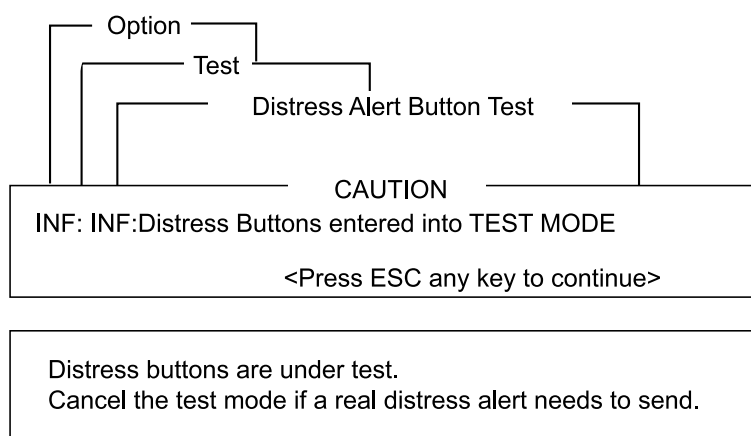


Fig. 5.10.2 CAUTION display

3. Press any [DISTRESS] on the Terminal unit, IC-305 and DMC-5 more than 4 seconds. The beep is sounded rapidly for 3 seconds. Then, it returns to the test mode sound. The system is normal when the message below appears in “CAUTION” window.

****Pressed [DISTRESS] button****

- Test for the Terminal unit
- Test for IC-305
- Test for DMC

****Message****

- : *Distress Button work correctly.*
- : *Distress ALEART work correctly.*
- : *DMC work correctly.*

4. To return to the original display, press [Esc].
For DMC-5, the message, “Wait for dist ack” is displayed. Turn off the unit once and then set the DMC again.

5.11 Saving and loading of system setting

For the back up of the system setting, the setting value is saved and loaded onto/from the floppy disk.

Saving

1. Press [F8][9][6] to show “Save/Load” display.

Save /Load
Save to FD
Load from FD

2. Select “Save to FD” and press [Enter].

Save to FD
1. ALL
2. Station List
3. LES List
4. E-Mail Service List
5. Other

3. Select the item to be saved. When selecting “1. All”, items from “2. Station List” to “5. Other” are saved.
4. Select [Yes] and press [Enter].
5. When “OK to Save ?” display appears, select “Yes” and then press [Enter].

Table 5.11.1 File name when saving

Item	File name	Description
2. Station List	STATION.DAT	[F8]-9-1: STATION list
3. LES List	LES.DAT	[F8]-9-2: LES list
4. E-Mail Service List	EMAIL.DAT	[F8]-9-5: E-MAIL service list
5. Other	DTE.DAT	Other settings for the terminal unit [F8]-3: Editor Setup, [F8]-4: Terminal Setup, [F8]-7: E-Mail Setup, [F8]-2: Network Setup, [F8]-2: IMN
	SYSTEM.DAT	Settings for DCE [F8]-2: System Setup(Other than IMN), [F8]-5: EGC Setup, [F8]-9-3: EGC Channel list, [F8]-9-4: NCS Channel list,

Loading

1. Press [F8][9][6] to show “Save/Load” display.

```
— Save /Load —  
Save to FD  
Load from FD
```

2. Select “Load from FD” and press [Enter].

```
— Save to FD —  
1. ALL  
2. Station List  
3. LES List  
4. E-Mail Service List  
5. Other
```

3. Select the item to be loaded. When selecting “1. All”, items from “2. Station List” to “5. Other” are loaded.
4. Select [Yes] and then press [Enter]. Items in the floppy disk is loaded to the terminal unit.

Note)

Refer to 4-1 pages for “Save/Load” operation in the [DTE] port (PC terminal).

Chapter 6. Updating program

6.1 Updating program

The program for TERM CPU and RF CON/CPU is updated.

To update the program, insert the floppy disk to the floppy disk drive and then turn on the terminal unit, IC-215. The updating starts automatically.

Table 6.1.1 Program number

Program	Program number
TERM CPU	1650162-01.xx
RF CON/CPU	1650159-01.xx

6.1.1 Checking program version

1. Check the program version of RF CON CPU and TERM CPU by the self-test ([F7/Option]-[7/TEST]-[3/Self Test]).

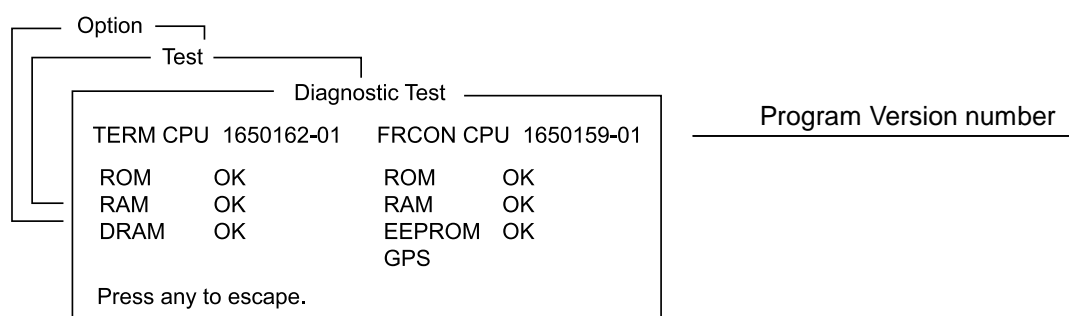


Fig. 6.1.1 Checking program version

2. Checking detail program version

After the test, press [F] [E] [L] [C] [O] [M] while holding [Ctrl] to show the program version in detail.

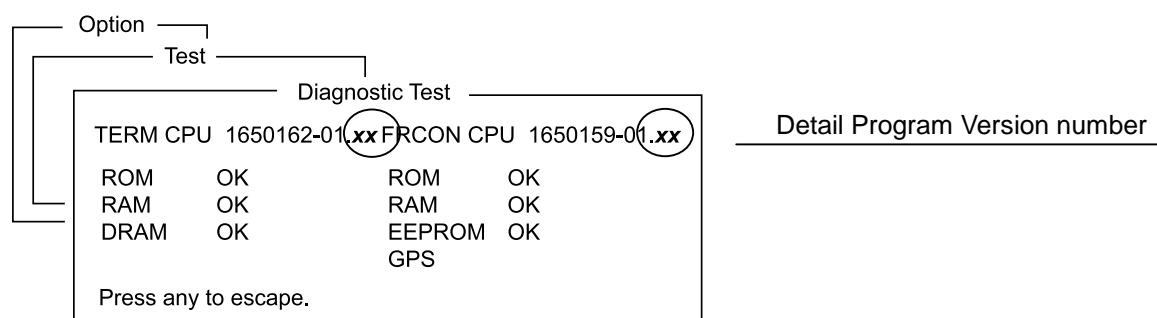


Fig. 6.1.2 Checking detail program version

6.1.2 Procedure

1. Set the floppy disk, TERM CPU or RF-CON CPU to the floppy disk drive of the terminal unit.

2. Turn on the system.

3. The following message appears.

When TERM CPU is updated.

FD Boot Ver1.03
IC-215 Terminal Software update for Nera C
Loading: LOADING_A.BIN----Xsec

Nera C Term CPU Software Update

Are you sure update ? (Y/N)

When RF-CON CPU is updated.

FD Boot Ver1.03
MAC Address writer for Nera C
Loading: UPRFCON.BIN----Xsec

Nera C Rfcom CPU Software Update

Are you sure update ? (Y/N)

4. Press [Y] to update the program.

5. The updating program starts automatically. The following message appears.

When TERM CPU is updated.

Now erasing
Now Updating program
Updating xx % (last xxx sec)

When RF-CON CPU is updated.

Execute STEP1
Execute STEP2
Now erasing
xxx percent completed

6. The updating is finished with the following message/display appears.

When TERM CPU is updated.

The status display appears automatically.

When RF-CON CPU is updated.

Finish Version up.data
Please power OFF, and remove the FD

7. Turn off the system, and turn it on again.

8. Check the program version of RF CON CPU and TERM CPU by the self-test.

6.2 Program files

Each program disk contains following files. Note that the file size is reference only.

Table 6.2.1 Program files

TERM CPU		RF-CON CPU	
File	Size	File	Size
Boot.ini	1k	Boot.ini	1k
Termcpu.bin	683k	Loadrfc.bin	5k
Loadfd_a.bin	46k	Rfconcpu.bin	360k
		Uprfcon.bin	43k

6.3 Installing Terminal software to PC

The terminal software of Nera C is required to install to the PC connected to [DET] port.

- Type: 16-5-0164 - Code No.: 000-4438-920
- Program number: 1650164-xx

OS: Windows 95/98/2000/NT/ME/XP

Memory: 32 MB and more

Free space on the hard disk: 20 MB and more

CPU: Pentium 100 MHz and more

Floppy disk drive: Available

The procedure to update terminal software is the same as that of software installation.

To install/update terminal software:

1. Insert PC terminal program floppy disk into the floppy disk drive.
2. Double click "setup.exe" file, and the installation starts automatically.



- Follow instruction which appears on the screen. When updating Nera C terminal software, overwrite "F15PC.EXE" file.



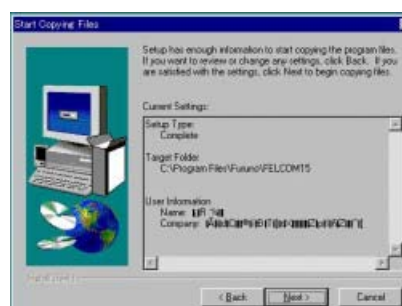
1. Click "NEXT".



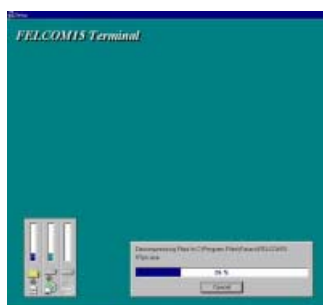
2. Check the folder to which the program is installed and then click "NEXT".



3. Click "NEXT".



4. Click "NEXT".



5. Wait until the process is completed.



6. Click "Finish".

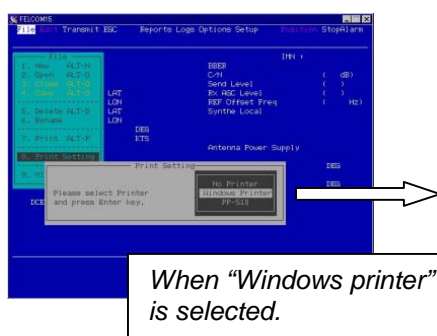
- After installation, turn off the PC and on it again. To run Nera C terminal software, double click "F15PC.EXE" icon.



"F15PC.EXE" icon

Note)

1. When the Nera C terminal for PC is used, the installation is automatically started by opening “F15PC.EXE”.
2. Change setting “Active Port” of [F8] [2] of IC-215 to “All”.
3. Some item of [F8] cannot be set by PC terminal.
4. Commercial printer for Windows and PP-510 can be connected to “Printer” port on PC. Printer setting is made through “Printer setting” menu ([F1]-8).
With the commercial printer, error messages, such as “WARNING, TROUBLE: XXX” are not printed out.



“Printer setup” appears, select to printer.

Program disks contain following files. The file size is reference only.

Terminal program for PC			
File	Size	File	Size
inst32i.ex	288 k	Setup.exe	45 k
_isdel.exe	8 k	Setup.ini	1 k
_setup.1	407 k	Setup.ins	80 k
_setup.lib	200 k	Setup.iss	1 k
Disk1.id	1 k	Setup.pkg	1 k

Following files are automatically created every time F15.EXE is executed.

- F15PC.LOG: Communication log file ([F6]-4), saving 32 logs.
- F15PC.REP: Settings in “Message, Data Report” ([F5]-1,2) menu from terminal unit
- F15PC.RXM: Receiving message ([F6]-2 and -3) log files, saving 32 logs or 32 kB.
- F15PC.TXM: Sending message ([F6]-1) log file, saving 5 logs.
- F15PC.DAT: Includes following settings;
Editor Setup ([F8]-3), Terminal Setup ([F8]-4), Auto Mode Setup ([F8]-6),
E-Mail Setup ([F8]-7), Directory ([F8]-8), Station List (F8-9-1),
LES List ([F8]-9-2), E-Mail Service List ([F8]-9-5) and Printer Setting ([F1]-8)

7.1.1 Display of bottom left

The diagram illustrates a sequence of three messages (a, b, and c) being received by a system. The messages are represented by arrows pointing to a box containing the text: "Current Status : TESTING", "TESTING ~ RECEIVING MESSAGE", and "DCE F15 Ver: 0x".

1. “DCE F15 Ver.0x”: Normally displaying the version number of RF CON/CPU board.

- Note) “FFA” is added when the device is FFA version.

The display of “b” part

1. “CALLING”: *During Calling.*
2. “WAITING FOR ACKNOWLEDGEMENT”:
When waiting the receiving acknowledgement from the coast station.
3. “RECEIVING EGC MESSAGE”: *When receiving EGC message.*
4. “WAITING FOR BACKOFF” : *When waiting the transmission of the data report.*

Login/Logout ([F7]-1, 2)

5. “Successful Login.” : *When Login is succeeded.*
6. “Login failed.” : *When Login is failed.*
7. “Successful Logout.” : *When Logout is succeeded.*
8. “Logout failed.” : *When Logout is failed.*

Distress alert

9. “Successful Distress Alert.” : *When the release of the distress alert is succeeded.*
10. “Distress Alert failed.” : *When the release of the distress alert is failed.*

Forced clearing ([F7]-3(Abort))

11. “Successful Forced Clearing.”:
When stopping the scan, the transmission and the reception.
12. “Forced Clearing failed.”: *When the forced clearing is failed.*

Communication from Ship to Shore

13. “SENDING MESSAGE PACKETS”:
While the transmission message packet is send.
14. “WAITING FOR ACKNOWLEDGEMENT”:
When waiting the receiving acknowledgement from LES after sending the message.
15. “Successful sending to LES.”:
When the transmission of the message to LES is succeeded.
16. “Sending message failed.” : *When the transmission of the message to LES is failed.*
17. “Call rejected.” : *When LES rejects the transmission message.*
18. “Call pending.” : *When LES stops the communication temporary.*

Communication from Shore to Ship

19. “Received Call.” : *When receiving the call from LES.*
20. “Received Call (ITA2).” : *When receiving the call from LES.*
21. “RECEIVING MESSAGE PACKETS”:
During the reception of the receiving message packet.
22. “CLEARING” : *When clearing the reception sequence.*
23. “Successful receiving.” : *When receiving the message successfully.*
24. “Receiving failed.” : *When the reception is failed.*

Data Report ([F5]-1)

25. “Successful Data Report.”: *When the data report is succeeded.*
26. “Data Report failure.”: *When the data report is failed.*

PV TEST ([F7]-7-1)

- 27. “*PV TEST CALL is rejected.” : *When PV test is rejected by LES.*
- 28. “*PV TEST CALL is pending.” : *When PV test is pended.*
- 29. “*TEST--RECEIVING MESSAGE” : *During the reception of the message from LES.*
- 30. “*TEST--SENDING MESSAGE” : *During the transmission of the message to LES.*
- 31. “*TEST--DISTRESS ALERT” : *During the transmission of the distress message to LES.*
- 32. “*WAITING FOR ACTIVATION” : *When waiting the PV test is started.*
- 33. “*WAITING FOR TEST RESULT” : *When waiting for the result of the PV test from LES.*
- 34. “*CLEARING” : *When clearing the PV test mode.*
- 35. “PV TEST is Completed.” : *When the PV test is completed.*
- 36. “PV TEST Failure.” : *When the PV test is failed.*

The display of “c” part

- 1. Idle : *Idle. Waits for the transmission or the reception.*
- 2. Idle (Pending) : *Idle. Waits for the reception from LES.*
- 3. Sending : *During the transmission of the message.*
- 4. Receiving : *During the reception of the message.*
- 5. Login : *During the process of Login.*
- 6. Logout : *During the process of Logout.*
- 7. Distress Alert : *During the release of the distress alert.*
- 8. Data Report : *During the transmission of the data report.*
- 9. Testing : *During the PV test.*
- 10. Test Setup : *During the request of the PV test.*
- 11. Scanning : *During NCS common channel scanning.*
- 12. EGC RECEIVER : *When the mode is set to EGC receiver mode.*
- 13. Delivery Status Req. : *During the transmission of the delivery status request.*
- 14. Forced Clearing :
During the forced clearing of the scan, the transmission and the reception.

7.1.2 Display of bottom center

File	Edit	Transmit	EGC	Reports	Logs	Options	Setup	Position	StopAlarm
									IMN : 443156710
Date			02-10-01			BBER			000
Time			06:12 (UTC)			C/N			OK (38 dB)
						Send Level			OK (0)
Position			LAT 35:00.00N			Rx AGC Level			OK (133)
			LON 135:00.00E			REF Offset Freq			OK (0 Hz)
Waypoint			LAT			Synthe Local			OK
			LON						
Course			321.1 DEG						
Speed			10.1 KTS						
Current NCS			344 (IOR)	LOGIN		Antena Power Supply			OK
Current Channel			LES TDM						
Current TDM			LES TDM			Water Temereature			23.4 DEG
MES Status			Busy			Water Current			
GPS Status			3D			Direction			123.4 DEG
						Speed			2.0 KTS
DCE Memory			32812 Bytes free			Depth			123.4 FT
Current Status : TESTING									02 - 01 - 01 06:12 (UTC)
TESTING -- RECEIVING MESSAGE									LAT : 35:00.00N
DCE F15 Ver. 0x									LON : 135:00.00E

The display of “a” part: Displaying the frame sync

1. “Retuning” : During the change of the channel or the transmission.
2. “SYNC (NCS)” : During the synchronization to NCS common channel.
3. “SYNC (LES)” : During the synchronization to LES TDM channel.
4. “MES Sig. Ch” : When changing to MES signaling channel.
5. “MES Msg. Ch” : When changing to MES message channel.
6. “UNSYNC” : When un-synchronizing.

The display of “b” part: Displaying the receiving ocean region

7. “NCS: AOR-W” : The west area of Atlantic Ocean.
8. “NCS: AOR-E” : The east area of Atlantic Ocean.
9. “NCS: IOR” : Indian Ocean.
10. “NCS: POR” : Pacific Ocean.

The display of “c” part: Displaying Log-in/out status

11. “LOGOUT” : When logout from the ocean region.
12. “LOGIN” : When login to the ocean region.
13. “LOGIN (Blinking)” : During the registration to the ocean region.

The display of “d” part

14. “ ” : When the saving memory of the RX message is empty or the printer is working.
15. “REC.MESSAGE EXIST” (Blinking) : When the printer does not work after receiving the message or the secret confidential message is received.
16. “Data Report” (Reverse display) : When the data report is set to ON.
17. “Message Report” (Reverse display) : When the message report is set to ON.

7.1.3 Display of bottom right

File	Edit	Transmit	EGC	Reports	Logs	Options	Setup	Position	StopAlarm
Date			02-10-01			BBER		IMN : 443156710	
Time			06:12 (UTC)			C/N		000	
						Send Level		OK (38 dB)	
Position			LAT 35:00.00N			Rx AGC Level		OK (0)	
			LON 135:00.00E			REF Offset Freq		OK (133)	
Waypoint			LAT			Synthe Local		OK (0 Hz)	
			LON					OK	
Course			321.1 DEG						
Speed			10.1 KTS						
Current NCS			344 (IOR) LOGIN			Antena Power Supply		OK	
Current Channel			LES TDM						
Current TDM			LES TDM			Water Temereature		23.4 DEG	
MES Status			Busy			Water Current			
GPS Status			3D			Direction		123.4 DEG	
						Speed		2.0 KTS	
DCE Memory			32812 Bytes free			Depth		123.4 FT	

Current Status : TESTING				SYNC (LES)		02 - 01 - 01 06:12 (UTC)			
TESTING -- RECEIVING MESSAGE				NCS : IOR LOGIN		LAT : 35:00.00N			
DCE F15 Ver. 0x						LON : 135:00.00E			

The display of “a” part

1. “Date & Time (UTC)”:

The data is input automatically. The time data is calculated from the TDM frame signal, and the date data uses the data from ZDA. If there is no ZDA, then manual input date([F8]-2) is used. Updates every one minute.

The display of “b” part

2. “Position (L/L)”:

Displays own ship's position data. The external navigation system, the GNSS and the manual input are selected by the system setting. When NAV data is input, the data is updated every 30 seconds. When the manual input is selected and the data is not updated for more than 4 hours, the blinking starts and the buzzer is released every 30 seconds.

7.1.4 Display of upper part

File Edit Transmit EGC Reports Logs Options Setup Position StopAlarm			
Date	02-10-01	BBER	000
Time	06:12 (UTC)	C/N	OK (38 dB)
		Send Level	OK (0)
Position	LAT 35:00.00N	Rx AGC Level	OK (133)
	LON 135:00.00E	REF Offset Freq	OK (0 Hz)
Waypoint	LAT	Synthe Local	OK
	LON		
Course	321.1 DEG		
Speed	10.1 KTS		
Current NCS	344 (IOR) LOGIN	Antena Power Supply	OK
Current Channel	LES TDM		
Current TDM	LES TDM	Water Temereature	23.4 DEG
MES Status	Busy	Water Current	
GPS Status	3D	Direction	123.4 DEG
		Speed	2.0 KTS
DCE Memory	32812 Bytes free	Depth	123.4 FT

Current Status : TESTING		SYNC (LES)	02 - 01 - 01 06:12 (UTC)
TESTING ~ RECEIVING MESSAGE		NCS IOR LOGIN	LAT : 35:00.00N
DCE F15 Ver. 0x			LON :135:00.00E

The display of “a” part: Distress alert

1. “ ”: *No distress alert.*
2. “Sending Distress Alert” : *When the distress alert is sent.*
3. “Sending Distress Alert Test ” : *When the distress alert test is sent (PV Test).*
4. “Distress Acknowledgement Received”:
When the distress acknowledgement from the LES is received after sending the distress alert.
5. “Distress Message Call Activated”:
When the message which category is set to distress is sent.
6. “Distress Message Call Acknowledged”:
When the distress message acknowledgement from the LES is received after sending the message which category is set to distress.
7. "Distress Button Test Mode" : *During the Distress Alert Button Test ([F7]-7-4).*

The display of “b” part

8. “ ” : *During idle mode.*
9. Stand alone Mode : *When the preset LES is set to NCS.*
10. Restoration Mode (Network Update Received)
11. Restoration Mode (Blinking) : *When NCS is out of order.*
12. Restoration Mode (Reverse display):
When the preset LES displays the NCS common channel which is out of order.

7.1.5 Display of status display part

File	Edit	Transmit	EGC	Reports	Logs	Options	Setup	Position	StopAlarm									
Date	02-10-01		BBER		IMN : 443156710		000											
Time	06:12 (UTC)		C/N		OK (38 dB)													
Position	LAT 35:00.00N		Send Level		OK (0)													
	LON 135:00.00E		Rx AGC Level		OK (133)													
Waypoint	LAT		REF Offset Freq		OK (0 Hz)													
	LON		Synthe Local		OK													
Course	321.1 DEG																	
Speed	10.1 KTS																	
Current NCS	344 (IOR)	LOGIN	Antena Power Supply		OK													
Current Channel	LES TDM																	
Current TDM	LES TDM		Water Temereature		23.4 DEG													
MES Status	Busy		Water Current															
GPS Status	3D		Direction		123.4 DEG													
			Speed		2.0 KTS													
DCE Memory	32812 Bytes free		Depth		123.4 FT													
Current Status : TESTING				SYNC (LES)		02 - 01 - 01 06:12 (UTC)												
TESTING -- RECEIVING MESSAGE				NCS :IOR LOGIN		LAT : 35:00.00N												
DCE F15 Ver. 0x						LON : 135:00.00E												

1. “Sending Distress Alert” : *When the distress alert is sent.*
2. “Distress Acknowledgement Received”:
When the distress acknowledgement from the LES is received after sending the distress alert.
3. “Distress Message Call Activated”:
When the message which category is set to distress is sent.
4. “Distress Message Call Acknowledged”:
When the distress message acknowledgement from the LES is received after sending the message which category is set to distress.
5. Distress buttons are under test. Cancel the test mode if a real distress alert needs to send.
When during the distress button test mode. ([F7]-7-4).

7.2 Messages for Operation

7.2.1 Messages for [F1], File menu

1. "Overwrite?"
2. "OK to save?"
3. "OK to delete file?"
4. "Can't delete."
5. "Enter new filename"
6. "Can't rename."
7. "Insert new disk for drive"
8. "And select media type"
9. "Format start."
10. "xx% Completed."
11. "Format completed."
12. "Format failed."
13. "Press any key to escape."
14. "Abort process."
15. "Drive not ready."
16. "Write protected."
17. "Drive error."
18. "Checking"
19. "Decode?"
20. "Now decoding..."
21. "Complete."
22. "Decode failed."
23. "This terminal not support this code."
24. "Decoded %d file(s)."
25. "This file is not encoding."
26. "File is already exist. Overwrite?"
27. "Directory not found."

7.2.2 Messages for [F3], Transmit menu

1. "Input Error: Message File."
2. "Input Error: Country/Ocean Code."
3. "Input Error: Station ID."
4. "Input Error: Modem Type."
5. "Input Error: E-Mail Address."
6. "Input Error: LES ID."
7. "Input Error : Send Delay."
8. "Input Error : Prefix Code."
9. "Invalid character detected in message."
10. "Don't support E-Mail service in this NCS."
11. "Input Error: Too many stations."
12. "Message file is too large (but enable to send)."

13. "Attach file is too large."
14. "Attach file '%s' is not found."
15. "Message is entered in sending Queue. Press any key."
16. "Can't enter this message to sending Queue. Press any key."

7.2.3 Messages for [F5]-1, Data Report menu

1. "Input Error: Country/Ocean Code."
2. "Input Error: Station ID."
3. "Input Error : LES ID."
4. "Input Error: Interval Time"
5. "Input Error: Start Time"
6. "Input Error: Modem Type"
7. "Input Error: Report Contents"
8. "Input Error: Report Times"
9. "Input Error: Destination"
10. "Input Error: E-Mail Address"
11. "Don't support E-Mail service in this NCS."
12. "Input Error: Prefix Code"

7.2.4 Messages for [F7]-6-1, PV test

1. "Starting PV Test Process."
 "Automatic test mode: Normal communication disabled."
 "Do not press any distress button unless you are in distress."

7.2.5 Messages for Printer (Output from TERM CPU)

1. "Can't enter in Print Que."
2. "Print Que is Full."
3. "Can't print. PRINTER NOT READY."
4. "Can't print. Paper Low."
5. "Disk full. Can't enter in Print Que."

7.3 Cautions and information message

Note that the number of each message is not displayed.

176 INF: Logout request accepted. Please wait.
229 INF: Frequency Offset NG.
000 Signalling Channel congestion.
001 Lost TDM.
002 Reservation Lost.
003 The LES is out of service.
004 Too many retries.

Messages for self test error

144 TROUBLE: RFCON CPU ROM NG.
146 TROUBLE: RFCON CPU RAM NG.
152 TROUBLE: RFCON CPU EEPROM NG.

Messages for system trouble error

230 TROUBLE: Synthesizer UNLOCK.
226 TROUBLE: ANT power voltage abnormality.
227 TROUBLE: INCOMMING INDICATOR Fault.
228 TROUBLE: DMC connection abnormality.
236 TROUBLE: DISTRESS ALERT UNIT Fault.
224 TROUBLE: Carrier power level.
234 TROUBLE: EEPROM ERROR.
235 TROUBLE: Invalid MES ID, This equipment is defected. Please contact Nera SatCom.

Messages for warning

231 WARNING: Memory Full for receive message.
233 WARNING: Message received for DTE PORT. Please turn on DTE port equipment.
249 WARNING: Internal GPS UNIT failure.
240 WARNING: External NAV equipment failure.
242 WARNING: Can not enter new ENID. Memory Full for ENIDs.
248 WARNING: Can not enter new DNID. Memory Full for DNIDs.
143 WARNING: Synchronization loss. Please change EGC Channel.
128 WARNING: Synchronization loss. Please check the current NCS.
128 WARNING: Synchronization loss. Scanning NCS started automatically.
128 WARNING: BBER over 80%. Scanning NCS start manually.
131 WARNING: Can not find NCS CC in preferred region.
Scanning all region is started.
132 WARNING: Can not find NCS CC in all region. Scanning is continued.

Messages for information

“208 INF: [DISTRESS] Button switch activated.”
“250 INF: DMC switch activated.”
“251 INF: DMC activation has been canceled.”
“252 INF: DISTRESS ALERT UNIT switch activated.”
“253 INF: DISTRESS ALERT UNIT activation has been canceled.”

***** Distress Button Test *****

“209 INF: [DISTRESS] Button works correctly.”
“237 INF: DMC works correctly.”
“238 INF: DISTRESS ALERT UNIT works correctly.”
“254 INF: Distress Buttons enter into TEST MODE.”
“239 INF: Distress Buttons return to NORMAL MODE.”

“241 INF: Please update current ship position.”
“246 INF: NCS has gone outage. (RESTORATION Mode)”
“247 INF: You can select preferred LES by Network Information Window.”
“243 INF: Distress Priority Message received.”
“245 INF: Urgent Priority EGC Message received.”
“244 INF: Distress Priority EGC Message received.”
“256 INF: ENID ***** was entered by EGC message.”
“257 INF: ENID ***** was deleted by EGC message.”
“258 INF: DNID ***** was entered by Polling.”
“259 INF: DNID ***** was removed by Polling.”
“260 INF: Pre-set LES ID for DISTRESS ALERT is overridden by LES ***.”

***** Login *****

“017 Successful Login.”
“019 Login failed.”
“020 Login aborted.”
“022 MES Signalling Failure, Login Request not sent to NCS.”
“021 Timeout! Login Acknowledgement not received.”
“024 Login failed because of RESTORATION mode Network.”

***** Logout *****

“025 Successful Logout.”
“026 Logout failed.”
“027 Logout aborted.”
“029 MES Signalling Failure, Logout Request not sent to NCS.”
“028 Timeout! Logout Acknowledgement not received.”
“030 Logout failed because of RESTORATION mode Network.”

***** Distress Alert *****

“080 Distress Alert activated.”
 “081 Distress Alert completed.”
 “082 Distress Alert Test completed.”
 “083 Distress Alert Test aborted.”
 “084 Distress Alert Test failed.”
 “089 Distress Alert not sent to LES, trying to use NCS.”
 “087 Distress Alert not sent to NCS. NCS scanning is started.”
 “088 MES Signalling Failure, Distress Alert Test not sent.”
 “085 Timeout! Distress Alert not acknowledged.
 Distress Alert abandoned, Please re-send Distress Alert.”
 “086 Timeout! Distress Test not acknowledged.”
 “090 Low-Power-C mode does not supply Distress Call.”
 “091 Timeout! Distress Acknowledgement not received. Scanning NCS started automatically.”

***** Failed Timeout *****

“092 Distress Alert aborted.”
 “093 DISTRESS ALERT interrupt accepted.”
 “094 Distress Alert not sent to NCS. Distress Alert abandoned. Please re-send Distress Alert.”

***** Distress Alert *****

“095 Pre-set LES ID for DISTRESS ALERT is invalid in this ocean.
 Please input preferred LES ID in the menu [Distress Message Setup].”

***** Transmit *****

“049 Successful Sending message to LES.”
 “050 Sending message failed.”
 “051 Sending message aborted.”
 “057 MES Signalling Failure, during sending message.”
 “052 Sending message *aborted by LES because of*^{note1)} See page 7-14.
 “053 LES protocol error detected, Invalid Assignment.”
 “054 Call *rejected by LES because of*^{note2)} See page 7-15.
 “055 Call *pending by LES because of*^{note1)} See page 7-14.
 “056 Selected LES not exist in current region.”
 “058 Awaiting message transfer.”
 “059 Message sending failure, unauthorized DNID LES_ID pare.”
 “060 Successful Delivery Status Request.”
 “061 Delivery Status Request is failed.”
 “062 Delivery Status Request is aborted.”
 “063 MES Signalling Failure, Delivery Status Request not sent.”
 “015 Timeout! LES response not received.”

***** Receive *****

“065 Successful Receiving message.”

“066 Receiving message failed.”

“067 Receiving message aborted.”

“069 MES Signalling Failure, during receiving message.”

“070 Receiving message **aborted by LES because of**”,^{note1)}

See page 7-14.

***** Data Report *****

“122 Successful Poll Acknowledgement Sending.”

“123 Poll Acknowledgement Sending failed.”

“113 Successful Data Report Sending.”

“120 Data Report aborted.”

“119 Reserved access failure, trying unreserved access.”

“121 Data Report failed, too long report.”

“114 Data Report failed, unauthorized DNID.”

“115 Data Report failed, MES is not login.”

“118 MES Signalling Failure, Data Report failed.”

“116 Data Report failed, selected LES not exist in current region.”

“117 Data Report failed, TDM LOST.”

“124 Successful Data Report Programing by Polling.”

“125 Data Report Programing failure by Polling, invalid parameters.”

“126 Data Report Program has been initiated by Polling.”

“127 Data Report Program has been stopped by Polling.”

***** PV TEST *****

“097 PV TEST is completed.”

“098 PV TEST is failed.”

“099 PV TEST is aborted.”

“101 MES Signalling Failure, during PV TEST.”

“102 Receiving Test Failure, Timeout while waiting on NCS CC.”

“103 Sending Test Failure, Too many retries.”

“104 PV TEST is **aborted by LES because of**”,^{note1)}

See page 7-14.

“105 PV TEST is **pending by LES because of**”,^{note1)}

See page 7-14.

“106 PV TEST is **rejected by LES because of**”,^{note2)}

See page 7-15.

“107 PV TEST aborted because of RESTORATION mode.”

“108 Please activate Distress Alert TEST within 2 min.”

“109 TIMEOUT !! Distress Alert Test is automatically activated.”

***** Forced Clear *****

“033 Successful Forced Clearing.”

“034 Forced Clearing failed.”

“035 Forced Clearing aborted.”

“037 MES Signalling Failure, Forced Clear not sent.”

“036 Timeout! Clear not received.”

Note 1)

The messages followed by “aborted by LES because of” and “pending by LES because of” are as follows. These messages are sent from LES.

“LES timeout.”
“MES protocol error detected.”
“LES hardware error detected.”
“operator forced clear.”
“MES forced clear.”
“LES protocol error detected.”
“MES fatal hardware error detected.”
“MES timeout.”
“unrecognised presentation code.”
“unable to decode.”
“IWU number is invalid.”
“MES has not subscribed.”
“requested service unavailable.”
“access to requested service denied.”
“invalid service.”
“invalid address.”
“destination MES not commissioned.”
“destination MES not logged in.”
“destination MES barred.”
“requested service not provided.”
“protocol version not supported.”
“Unrecognized PDU type.”

Note 2)

The messages followed by “rejected by LES because of” are as follows. These messages are sent from LES.

“signalling failure.”
“LES message store full.”
“requested destination not service.”
“satellite congestion.”
“terrestrial congestion.”
“requested service not provided.”
“request in queue.”
“request barred.”
“MES not logged in.”
“MES not commissioned.”
“waiting TDM assignment.”
“illegal request”
“LES not in service.”
“requested service unavailable.”
“access to requested service denied.”
“invalid service.”
“invalid address.”
“unable to decode.”
“IWU number is invalid.”
“MES has not subscribed.”
“protocol version not supported.”
“PSTN modem type not supported.”
“Unrecognised PDU type.”

Command answer sentence

“301 Ignored: You are connected with DTE 2 port.”
“302 Ignored: Format Error.”
“303 Ignored: Undefined Command.”
“310 Ignored: Can not abort current process.”
“311 Ignored: Can not Forced Clear current process.”
“312 Ignored: Awaiting message transfer, Can not start PV TEST.”
“313 Ignored: PV TEST has been already started, and now pending.”
“314 Ignored: Sending Message not exist.”
“315 Ignored: Distress Request command not received.”
“316 Ignored: Can not start Distress Alert Test now.”
“320 Ignored: MES is not idle.”
“321 Ignored: Now receiving EGC message.”
“322 Ignored: MES is not Login. Please operate Login.”
“323 Ignored: Current Network is restoration mode.”
“324 Ignored: NCS Common Channel Failure.”
“340 Send message already exist in DCE.”
“341 Message not exist.”
“342 Service request not received.”
“350 Input Error: Service Code”
“351 Input Error: Message Reference No.”
“352 Input Error: Destination Type”
“353 Input Error: LES ID”
“354 Input Error: NCS ID”
“355 Input Error: Channel No.”
“356 Input Error: Date or Time”
“357 Input Error: MES Mode”
“358 Input Error: Navigation Select”
“359 Input Error: Sub_address”
“360 Input Error: Port Select”
“361 Input Error: Geographical Coordinate”
“362 Input Error: Navarea Code”
“363 Input Error: Fixed Area Code”
“364 Input Error: WMO Area Code”
“365 Input Error: NAVTEX Code”
“366 Input Error: EGC Auto Selection”
“367 Input Error: Protocol Code”
“368 Input Error: Nature Code”
“369 Input Error: Course Data”
“370 Input Error: Speed Data”

“No response from communication unit.”:

Message output from TERM CPU when no response is sent from RF CON/CPU after sending the command from TERM CPU.

***** Mail *****

“Can’t delivery a mail to server.”

“DHCP server not exist.”

Appendix 1) Inmarsat system

AP1.1 System Overview

AP1.1.1 System Configuration

Fig. AP1.1.1 shows the configuration of the Inmarsat system.

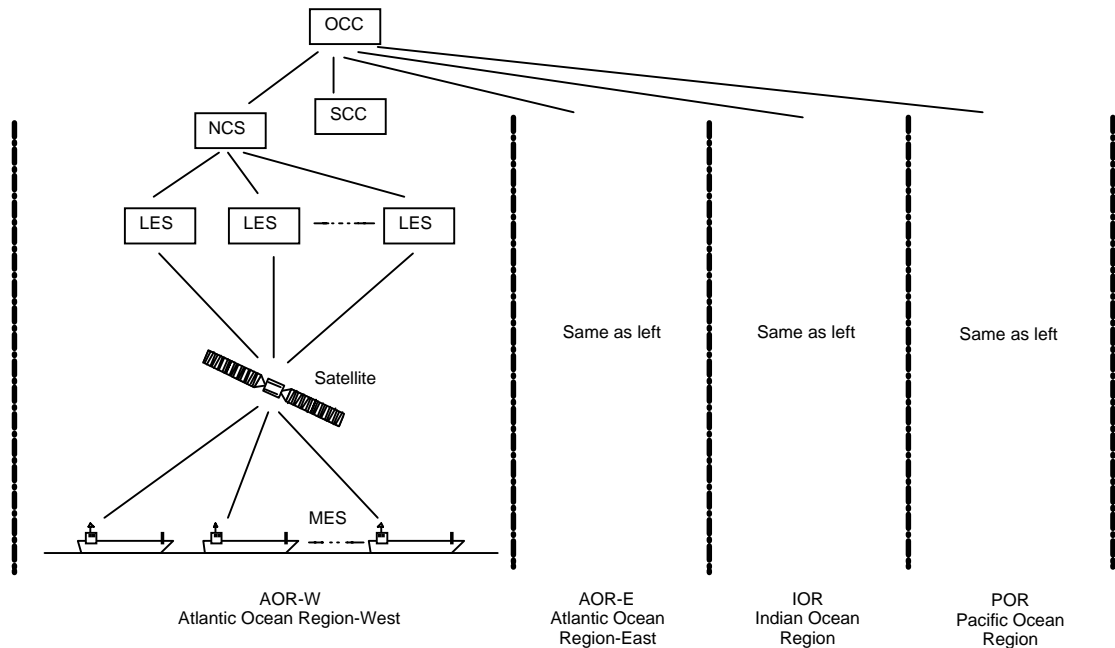


Fig. AP1.1.1 Configuration of Inmarsat system

Table AP1.1.1 Bodies and Roles

Body	Role
Operation Control Center (OCC)	It is located at Inmarsat's London headquarters and controls the system for 24 hours.
Satellite Control Center (SCC)	It is responsible for operating the satellites owned by the Inmarsat.
Network Coordination Center (NCS)	Each ocean region has its NCS which monitors and controls communications traffic between the LES and the satellite.
Land Earth Station (LES)	It acts as an interface between the MES and the terrestrial telecommunications network via the satellite.
Mobile Earth Station (MES)	It is the ship installed the Inmarsat .

Fig.AP1.1.2 shows the Inmarsat coverage area.

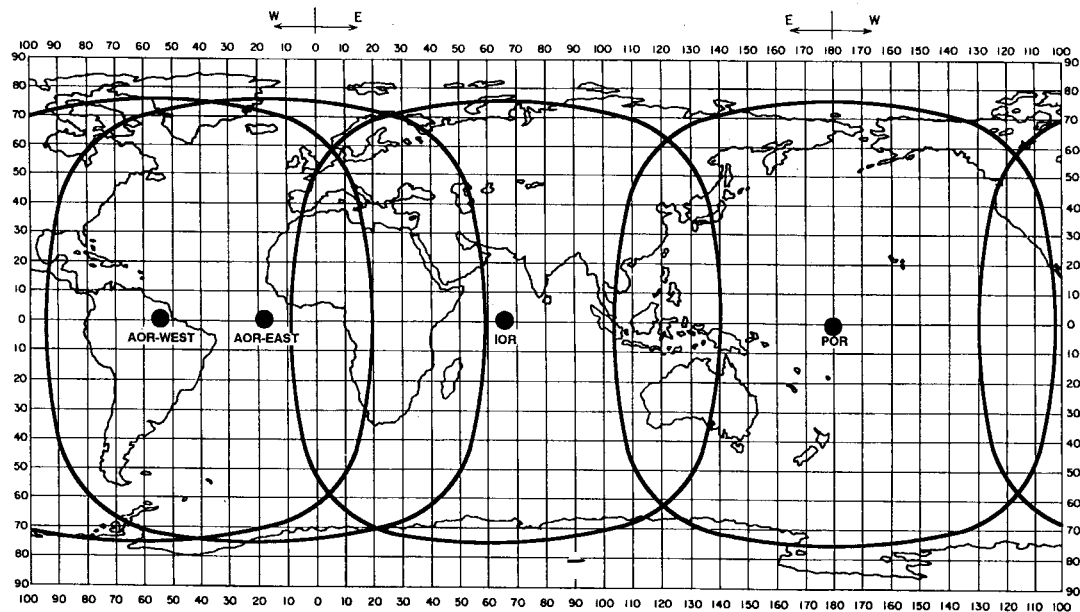


Fig. AP1.1.2 Inmarsat coverage area

Table AP1.1.2 Satellite position and NCS

Region	Satellite Name	Satellite Position	Inmarsat C NCS	Inmarsat B NCS
Atlantic Ocean Region-East (AOR-E)	Inmarsat-3, F2	15.5°W	Goonhilly	Comsat
Atlantic Ocean Region-west (AOR-W)	Inmarsat-3, F4	54.0°W	Goonhilly	Comsat
Pacific Ocean Region (POR)	Inmarsat-3, F3	178.0°E	Sentosa	Comsat
Indian Ocean Region (IOR)	Inmarsat-3, F1	64.0°E	Thermopylae	Thermopylae

Inmarsat website URL: <http://www.inmarsat.com/index.cfm>

AP1.1.2 Inmarsat C Services

The Inmarsat C system provides the following communication services.

- (1) Store-and-forward Telex message service
- (2) EGC (Enhanced Group Call) broadcasting: Safety Net and Fleet Net
- (3) Distress alerting and safety service

The following services are also available.

- Polling: The facility whereby an operational center sends a instruction to selected MES, to perform a defined task, such as return a pre-assigned data report.
- Data reporting: Data report, such as ship's position is sent regularly to a terrestrial subscriber.
- E-mail

Table AP1.1.3 lists each service of the Inmarsat system.

Table AP1.1.3 Comparison of each Inmarsat sytem service

Service	Inmarsat system				
	A	B	C	M	Mini M
Voice	Available	Available	Not available	Available	Available
FAX	Available	Available	Only sends TEXT to PSTN for Ship to Shore direction.	Available	Available
Telex	Available	Available	Available	Not available	Not available
Data communication	Available	Available	Available (DNID)	Available	Available
HSD Communication	Available	Available	Not available	Not available	Not available

Store-and-forward Telex service

The following briefly describes how a MES sends a ship-to-shore message.

- 1) When the MES sends a message, it transmits a channel assignment request to the LES. Then, the LES assigns the channel to the MES. After receiving a channel assignment, the MES starts transmitting the message in packets.
- 2) The LES stores the received message and reconfigured the message. The LES checks the received packets for errors, and if it finds any, returns acknowledgement packets identifying the packets in error to ask to send the message again. The reconfigured message is send to the intended destination via public network.
- 3) When the land subscriber sends the message, LES sends the message in packets to MES. The MES checks the received packets for errors, and if it finds any, returns acknowledgement packets identifying the packets in error to ask to send the message again. The MES stores the received message and reconfigured the message to output.

- 4) The communication speed is 600 Baud. It takes about 5 minutes to 10 minutes until the other station receives the message. Check the message "Delivery status" sent from LES whether the other station receives the message or not.

AP1.1.3 Destination Type

TELEX: The MES can send and receive messages to and from a telex terminal connected to the international telex networks.

The standard alpha-numeric character set known as Telex or ITA2 or 5-bit packeted.

This character set is based on 5-bit codes, and supports only upper case characters, so any lower case characters entered on your MES will be received at the destination as upper case.

Note that if the destination is a Inmarsat C terminal, this limitation is ignored.

PSTN (Public Switched Telephone Network):

The MES can send and receive messages to and from a computer or E-mail service on the international PSTN (telephone) landlines. If the land subscriber uses a modem T30 FAX, the MES can send messages to the fax.

PSDN (Packet Switched Data Network):

The MES can send and receive messages to and from a computer or E-mail service on the international PSDN (data) landlines.

These networks are also known as the X.25 networks.

The Internet E-mail service uses this network.

X.400 (Electronic Mail):

The MES can send and receive messages to and from registered subscribers to E-mail services which use the X.400 communications standards (protocol) on the PSDN landlines.

This service is not available yet.

DNID (Data reporting Network ID):

For a data reporting closed network, the owner/shipping company must register the MES with the relevant operational center. The center arranges with an Inmarsat-C CES to download data reporting network identification information, comprising a data network identification (DNID) code and a member number within the group.

CSDN (Circuit Switched Data Network):

This service is not available yet.

SPEC: 2-digit codes

Special service provided by a LES is accessible, using a special access code.

Two-digit codes are examples of special access code.

E-mail: E-mail can be sent through the LES which supports E-mail service.

The MES must register with the LES at first time and use the mail format specified by each LES.

22.5k byte image file can be attached to the E-mail if the LES supports.

- IA5: Known as ASCII, characters 7-bit codes. Supporting characters in messages sent or received using international alphabet 5. Specify this code to transmit English containing lower case alphabet.
- ITA2: Known as 5 bit packed. International Telegraph Alphabet 2 supports only upper case. Specify this code for message which contains only No.2 international communications alphabet. ITA2 code is transmitted faster than IA5 code. Land-based telex machines use ITA2. The LES converts all codes into ITA2. Codes which cannot be converted is shown with a question mark.
- DATA: Known as 8-bit data format. Used when sending data.

Table AP1.1.4

Message	Destination Network	Destination Type	Code	Remarks
English	Inmarsat-C	TELEX	IA5	
	Telex terminal	TELEX	IA5	
	FAX terminal	PSTN	IA5	Modem Type : T30 FAX
	E-mail	PSDN	IA5	
Japanese	Inmarsat-C	PSDN	DATA	
	Telex terminal	not available		
	FAX terminal	not available		
	E-mail	PSDN	DATA	
Russian	Inmarsat-C	PSDN	DATA	
	Telex terminal	TELEX	IA5	Thermopylae only
	FAX terminal	not available		
	E-mail	PSDN	DATA	
Data	Inmarsat-C	PSDN	DATA	
	Landlines	PSDN	DATA	

SPEC: 2-digit codes (Max. enter 5 digits or Charcters)

32 Medical Advice
 38 Medical Assistance
 39 Maritime Assistance
 41 Meteorological reports
 42 Navigational Hazards and warnings
 43 Ship position reports

31 Maritime enquiries
 33 Technical assistance
 37 Time and charges requested at end of call
 91 Loop back test

AP1.1.4 Charging

The maximum size of the transmitted message is 32 kbyte. Table AP1.1.5 shows the sample of KDDI charge list.

Table AP1.1.5 Charges from Inmarsat C As of Dec. 1, 2002

Destination	Comm. Type	From Japanese Terminals	From Foreign Terminals
		C(yen)	C(SDR)
		Every 256bit	
To Japan	Telex	26	0.15
	Fax	26	0.15
	Data	26	0.15
To countries beyond Japan (The rates are the same for calls to all countries/areas.)	Telex	63	0.36
	Fax	30	0.17
	Data	27	0.16
To Inmarsat-A	Telex	71	0.41
	Fax	44	0.25
To Inmarsat-B	Telex	62	0.36
	Fax	35	0.20
To Inmarsat-F (Fleet77)	Fax	33	0.19
To Inmarsat-M	Fax	40	0.23
To Inmarsat-C	Telex	30	0.17
	Data	30	0.17
To Inmarsat-Mini-M	Fax	33	0.19
Other charges (charges is every reference or message)			
Message status(every reference)		30	0.17
Call confirmation(every reference)		30	0.17
Notice form KDDI for undelivered		Free	

- * KDDI Land Earth Station (LES) can be used from all four ocean regions (POR, IOR, AOR-W, and AOR-E). The rates are the same for calls from all these ocean regions.
- * Normal transmission rate consists of 32 alphanumeric characters per 256bit unit.
If the ship terminal has a transmission rate of 1 character per 5 bits, it is possible to transmit 51 characters per 256bit unit.
- * The "header" portion of the message which contains various information such as the name of sender, address, etc., is also subject to charges.
The "header" portion usually costs the equivalent of about three 256bit units.

AP1.1.5 Network

Fig.AP1.1.3 shows the Inmarsat C channels and signals.

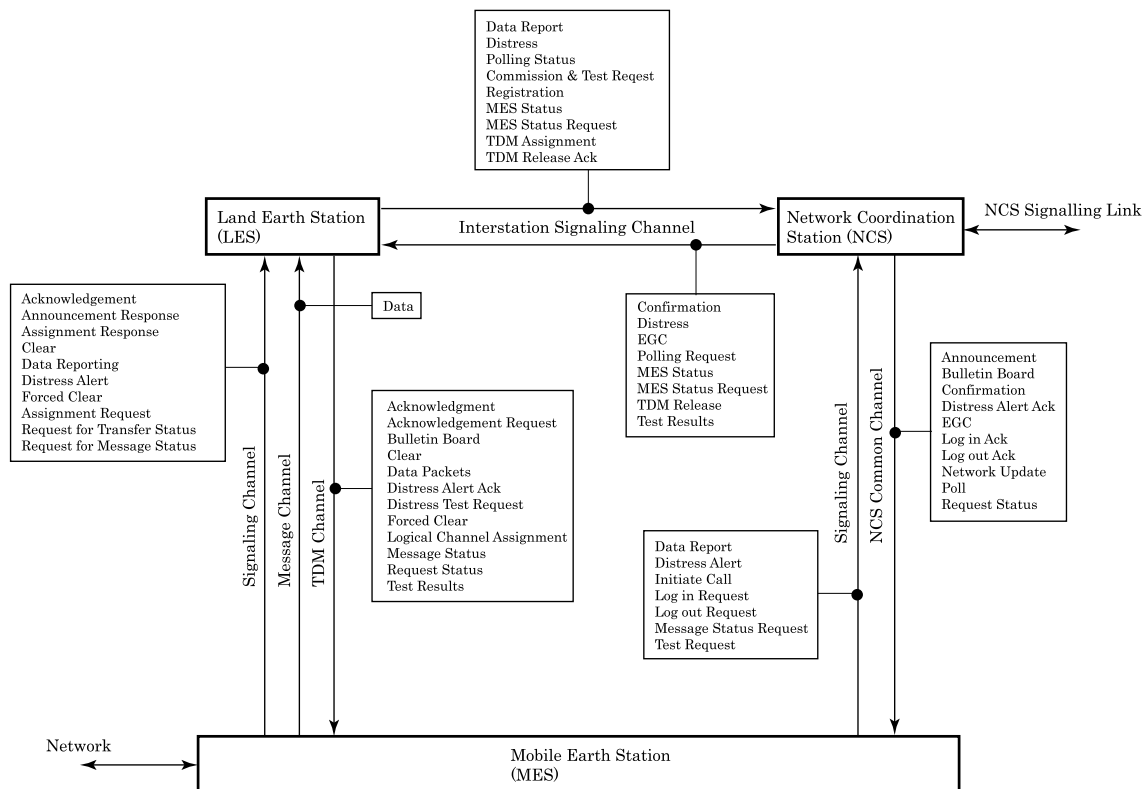


Fig. AP1.1.3 Channels and signals

NCS Common Channel

This channel is transmitted continuously (24 hours/day) by the NCS. The MES is received the NCS common channel when not engaged in message transfer. Its main functions are;

- informing that the message is sent from the shore to MES.
- informing the confirmation when MES sends the message to the shore.
- polling commands.
- EGC message transmission.
- sending the acknowledgement for inquiry of Login and logout from MES.
- Network information transmission.

LES TDM Channel (Time Division Multiplex Channel)

This channel is used to control the lines when the message is sent from LES to MES.

NCS/LES Signaling Channel

All LES is linked to NCS and this channel.

- a. contacting to NCS and then confirming whether the MES is login or not, when the shore sends the message to MES.
- b. forwarding EGC message to NCS.
- c. forwarding NCS received distress alerts to LES.

MES Message Channel

This channel is used when the message is sent to LES from MES. Each LES has a number of MES message channels assigned to it by the NCS. Allocation of MES message channels to MESs is done by the LES via LES TDM channel (the assignment packet).

MES Signaling Channel

This channel is used when MES sends the line controlling packets (channel assignment request, distress call, data reporting, etc.) to LES or NCS. This channel is worked by the combination of the slot aloha and the reserve access mode. The channel to be used and the slot information is transmitted by the NCS common channel and the LES TDM channel.

NCS/NCS Signaling Link

This is a data link between NCS. It is used when the information about MES in its coverage area is exchanged.

AP1.1.6 Frequency assignment

The MES operates in the TX frequency, 1626.5 MHz to 1646.5 MHz and the RX frequency, 1530.0 MHz to 1545.0 MHz.

The channel numbers are assigned in increments of 5 kHz as follows. The frequency used to LES or NCS from the satellite is 6 GHz, to the satellite from LES or NCS is 4 GHz.

Table AP1.1.6 Frequency

Channel No.	TX (MHz)	RX (MHz)
6000	1626.500	—
6002	1626.505	—
↓	↓	—
8000	1631.500	1530.000
8002	1631.505	1530.005
↓	↓	↓
13998	1646.495	1544.995
14000	1646.500	1545.000

- $TX (MHz) = 1626.5 + 0.0025(X_{ch} - 6000)$

- $RX (MHz) = 1530.0 + 0.0025(X_{ch} - 8000)$

AP1.2 Message & Signal Transfer

AP1.2.1 Ship- originated Call

Fig. AP1.2.1 shows how an MES sends a ship-to-shore message, using store-and-forward techniques.

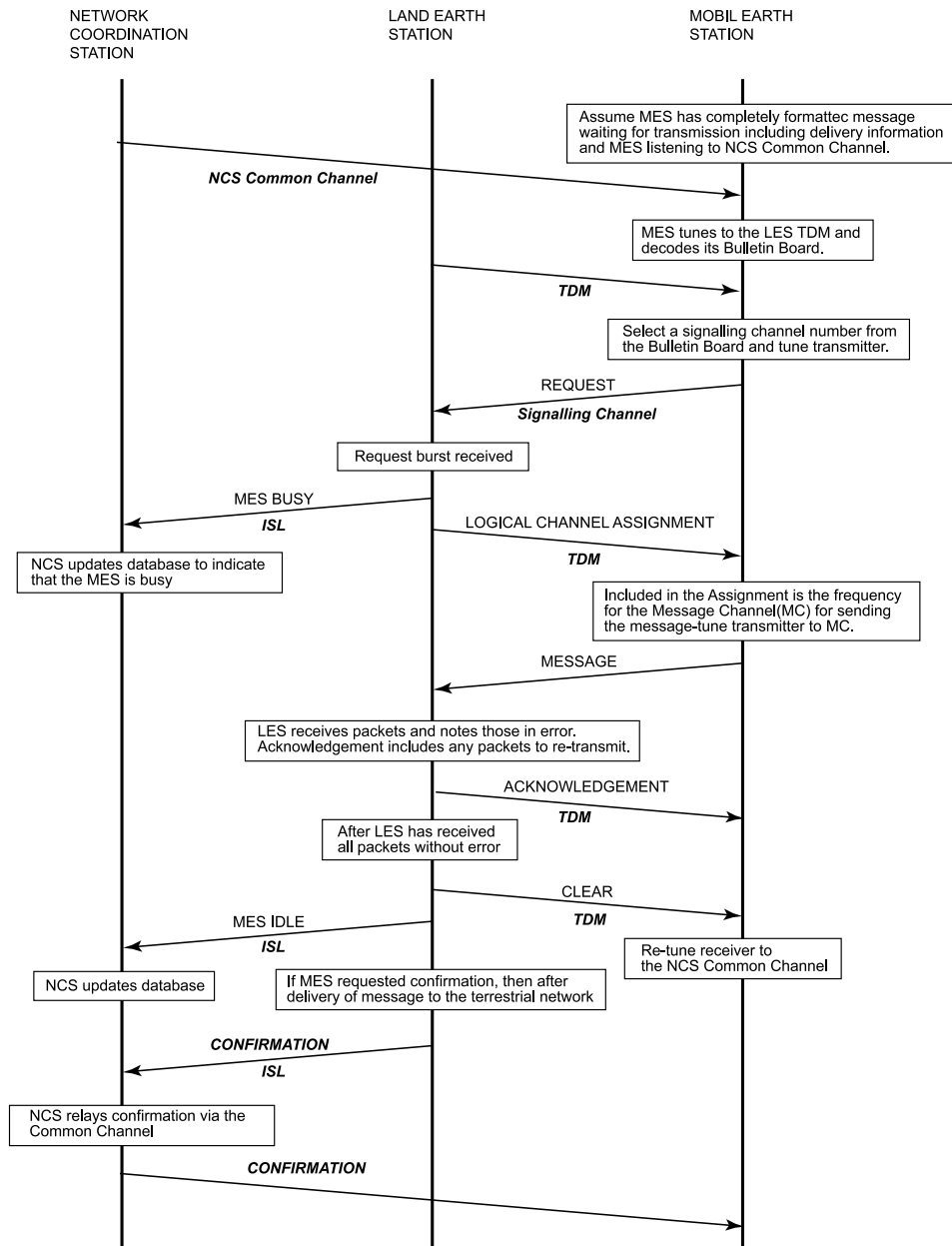


Fig. AP1.2.1 Ship to Shore communication flow

Ship-to-shore Message Transfer Steps

1. The MES normally receives the NCS common channel and decodes the information which is included in the NCS common channel to know the LES TDM channel.
2. The MES tunes to the LES TDM channel for the required LES.
3. The MES sends an "Assignment Request" packet on a signaling channel informed by the BB (Bulletin Board) and SCD (Signaling Channel Descriptor).
4. In response to the "Assignment Request" packet, the LES informs the NCS that it is communicating with the MES.
5. The LES sends the MES an "Assignment" packet. This establishes the link between LES and MES.
6. The MES sends the message on the assigned message channel and the slot timing.
7. After the LES receives all messages it sends "Acknowledgement" to the MES.
8. This "Acknowledgement" packet contains a list of any packets that were missed or received in error. Reception of an "Acknowledgement" packet prompts the MES to retransmit any messages in error.
9. When all messages are received error free, the LES sends "Clear" to the MES and tells the NCS that the MES is idle.

AP1.2.2 Shore- originated Call

Fig. AP1.2.2 describes how a subscriber to the public telecommunications networks can send a message to an MES.

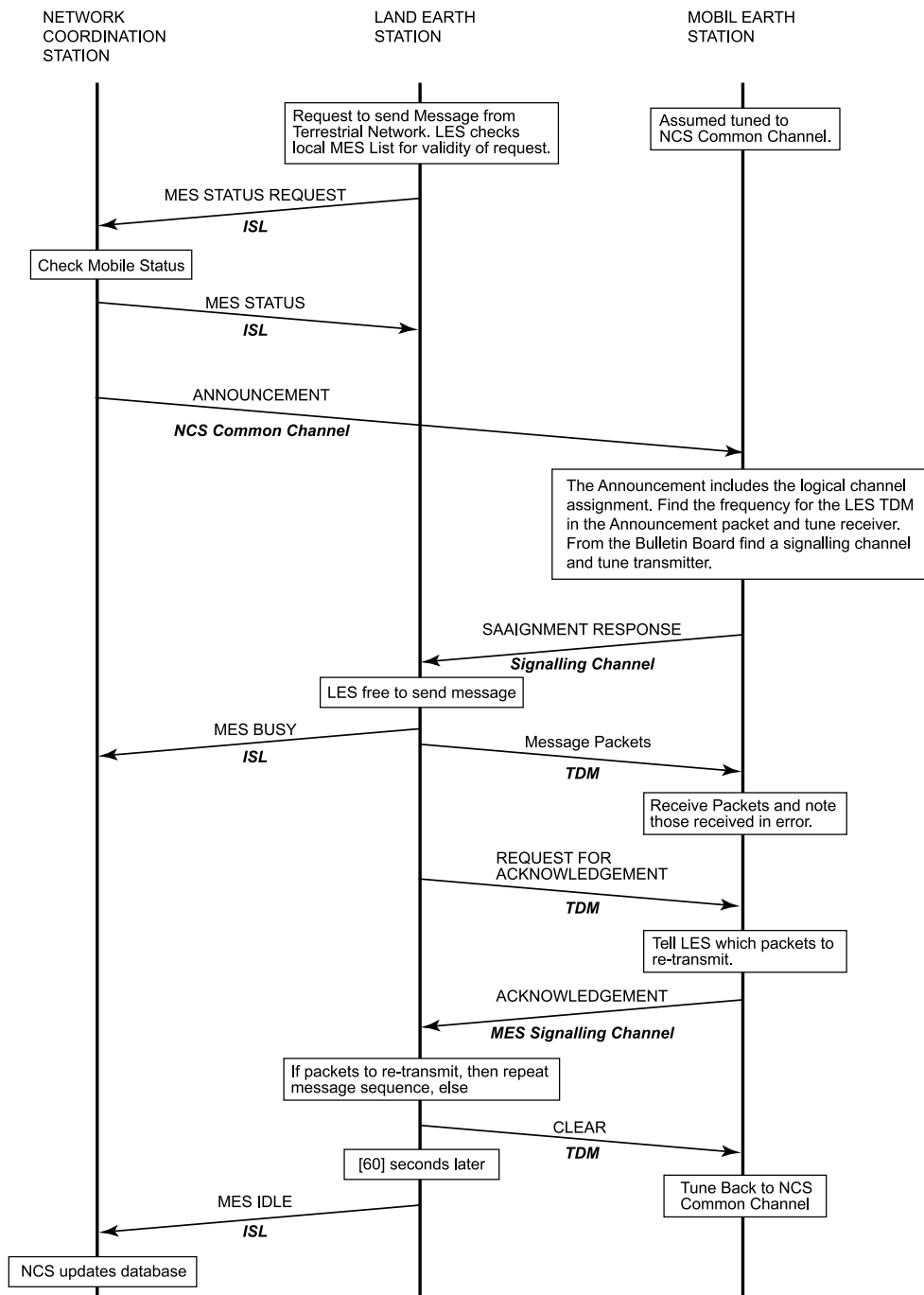


Fig. AP1.2.2 Shore to Ship communication flow

Shore-to-ship Message Transfer Steps

1. On receipt of the call over the public networks, the LES checks its MES database, to ensure that the MES is valid and logged-in.
2. The LES sends the result (MES status) to over the public networks.
3. If the MES is logged-in, the LES accepts and stores the incoming message.
4. The LES sends "MES Status Request Announcement" packet to NCS via "Interstation Signaling Link (ISL)". This packet requests the calling to the MES.
5. The NCS checks its database to find the status of the MES, and returns this information to the LES.

MES status

- Not in the region
- Idle (free)
- Busy (not free)

6. If the MES is idle, the NCS transmits "Announcement" packet over its common channel to the MES to inform the message. LES is also informed the message.
7. The MES receives the announcement and finds the message, which LES sends it and the LES TDM channel to be used. And then, the MES tunes to the LES TDM channel to be used.
8. The MES finds the frequency of the signaling channel and the slot number from BB (Bulletin Board) and SCD (Signaling Channel Descriptor) to send "Assignment response".
9. The MES transmits the "Assignment response" packet to the LES. This establishes the connection between MES and LES.
10. The LES sends a "MES status" packet to the NCS indicating busy status.
11. The LES transmits the message on the LES TDM channel to the MES.
12. After the message is transmitted, the LES sends "Acknowledgement request" packet to the MES.
13. The MES sends "Acknowledgement" packet, which contains a list of any packets that were missed or received in error. Reception of an "Acknowledgement" packet prompts the LES to retransmit any messages in error.
14. After all packets have been received error free, the MES sends the "Acknowledgement" packet.

15. If there are no further calls, the LES begins the call clearing process by sending a “Clear” packet.
16. After receiving the “Clear” packet the MES synchronizes to the NCS common channel to go to idle status.
17. The LES tells the NCS that the MES is idle.
18. The NCS updates its data base to show the MES is idle.

AP1.2.3 Log in/Log out

Each time the DTE and Communication Unit are turned on, the vessel should be registered with the Inmarsat C system to enable communications between vessel and LES. This is called login.

If the vessel is not going to be using the equipment for a prolonged period it should logout from the Inmarsat C system so the vessel can be registered as inactive.

Log in

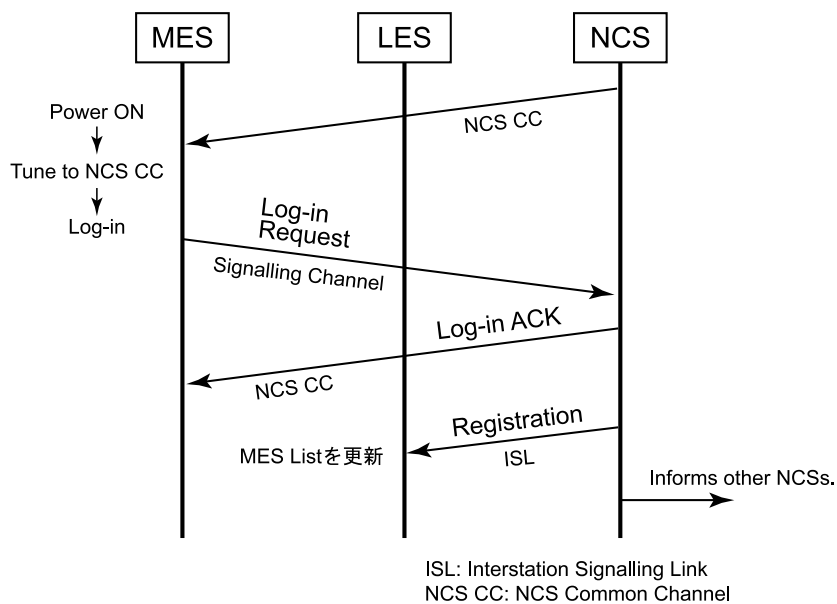


Fig. AP1.2.3 Log in flow

Log out

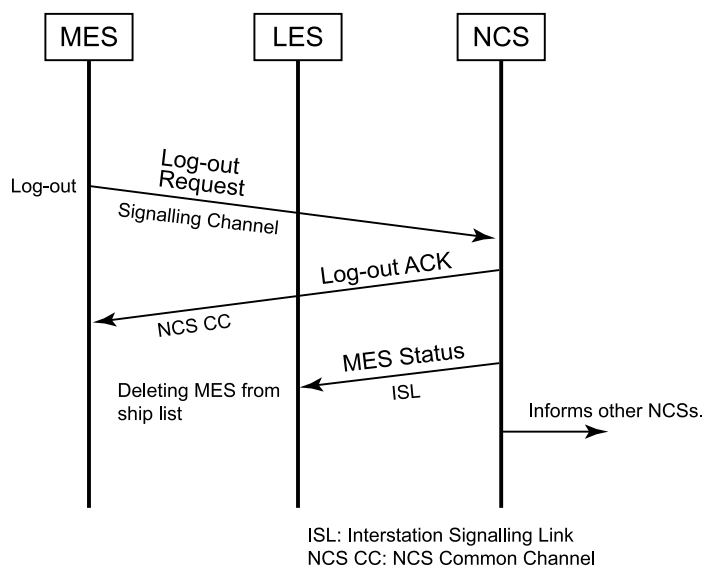


Fig. AP1.2.4 Log out flow

AP1.2.4 Distress Alert

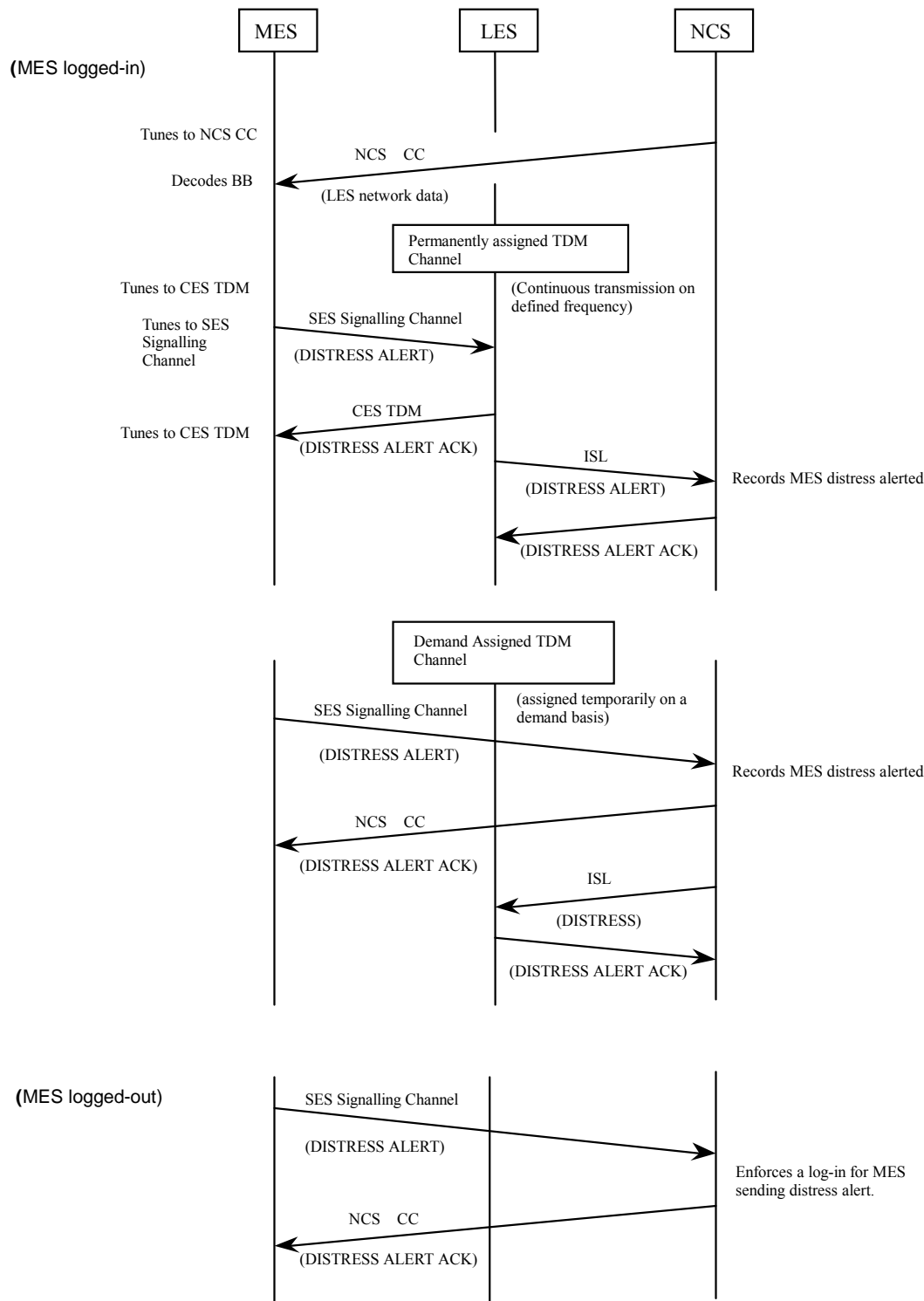


Fig. AP1.2.5 Distress Alert flow

AP1.3 Channel types and Signal processing

AP1.3.1 Channel types

A MES uses the following channels for the communications.

- 1) NCS Common Channel (NCS CC)
- 2) LES TDM Channel
- 3) MES Signalling Channel
- 4) MES Message Channel

Details of each channel are tabulated below.

Table AP1.3.1

	NCS Common Channel	LES TDM Channel	MES Signalling Channel	MES Message Channel
Use	MES signalling (Line control), EGC, etc.	MES signalling (Line control), LES to MES message	NCS, LES signalling (Line control)	MES to LES message
Contents	Refer to section AP1.1.5			
TX method	Continuous TDM	TDM (Time Division Multiplex), Continuous or on demand	TDMA (Time Division Multiplex Access)	SCPC (Single Channel Per Carrier)
Speed	8.64sec/frame 1200 symbols/sec	8.64sec/frame 1200 symbols/sec	1200 symbols/sec, 28 slots (2nd Gen.SV)	1200 symbols/sec (2nd Gen.SV)
Packet	640 bytes	640 bytes	15 bytes	128 bytes
Bulletin Board	Every frame	Every frame	-	-
Signal process (TX)	Scrambling	Yes	Yes	Yes
	Encoding	Yes	Yes	Yes
	Unique word	128 symbols	128 symbols	64 symbols
	Permuting	Yes	Yes	-
	Preamble	-	-	-
	Interleaving	Yes	Yes	-
Number of Symbols	10368 symbols	10368 symbols	316 symbols	10368 symbols

TDM: Time Division Multiplex. A process for transmitting two or more channel signals simultaneously to MES over a common channel path by using successive time intervals (time slots) for different channels.

TDMA: Time Division Multiplex Access. A system which allows a plural number of MES to access an LES (NCS) over a single transmission line by assigning each MES a time slot on the TDM channel in which to transmit over.

SCPC: Single Channel Per Carrier. Enables assignment of channel for a call.

1. NCS CC/LES TDM Channel

The NCS common channel and LES TDM channels share a common overall structure. The TDM channels are based on fixed-length frames of 10368 symbols transmitted at 1200 symbols/s giving a frame time of 8.64S. 10,000 frames are transmitted every day (8.64s x 10000= 24 hours).

Each frame carries a 639 byte information field, followed by a flush byte (all 0s).

The first packet in the information field is always the Bulletin Board (BB) packet.

The bulletin board contains information on the network configuration and the correct frame number.

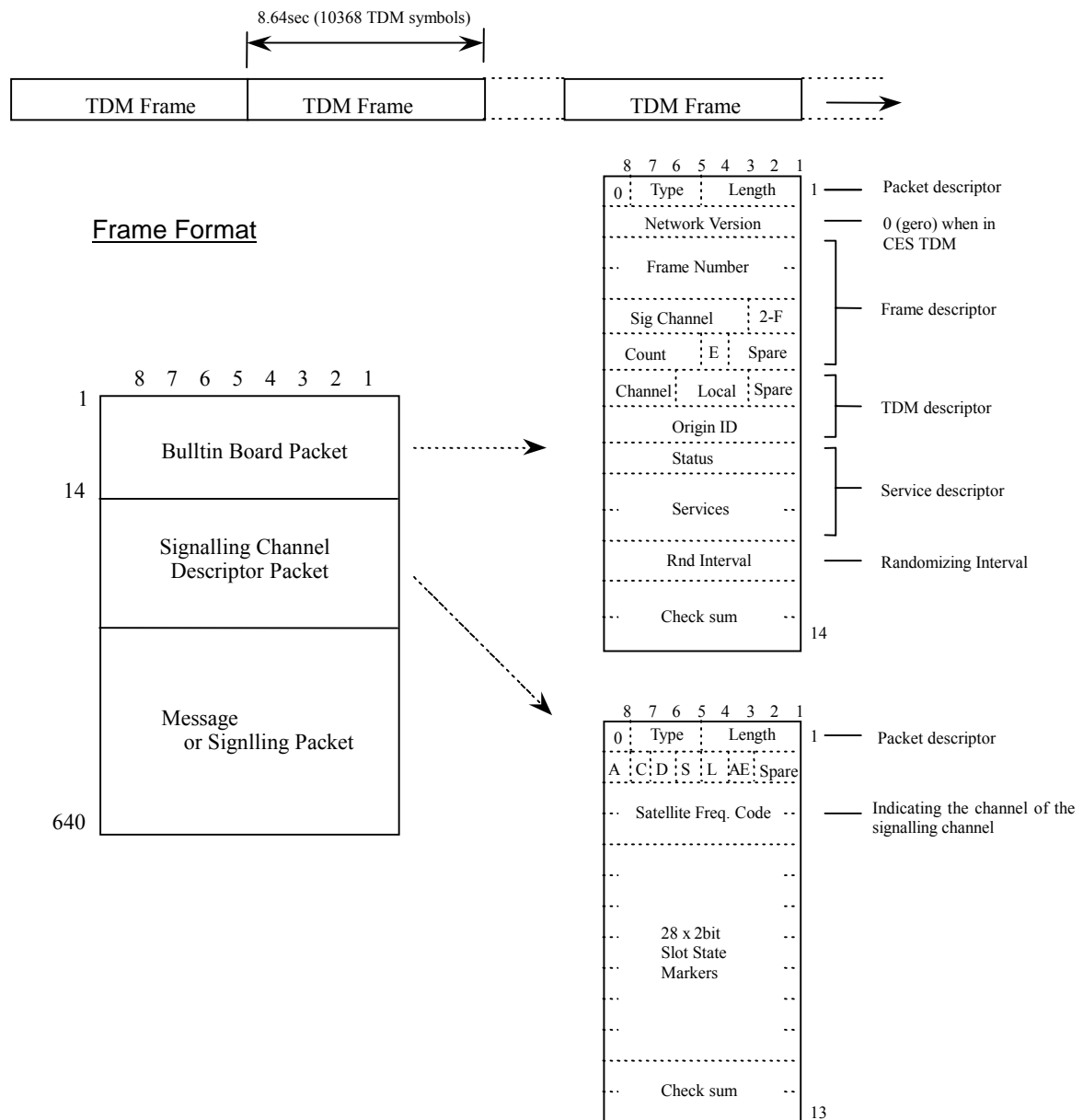
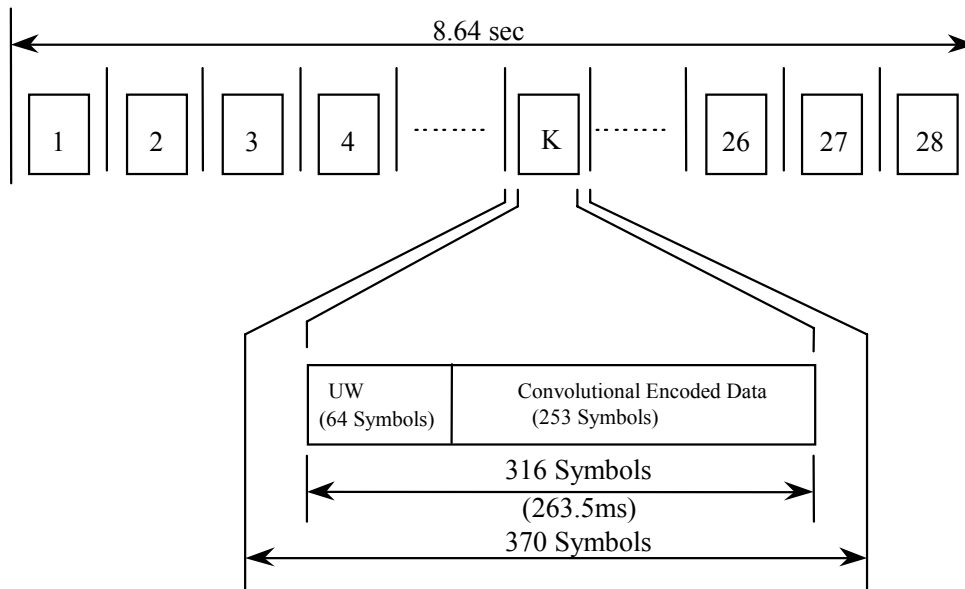


Fig. AP1.3.1 TDM frame configuration

2. Signaling Channel

The MES signalling channel packet is always a fixed length of 15 bytes (120 bits). This channel is used for signalling from MES to LES and NCS. For example, the packet "Assignment Request" contains MES ID, LES ID, message size, and information of network to be connected. Further, short messages such as data reporting (ship's position, speed and course, etc.) is sent to LESs and NCSs on this channel.

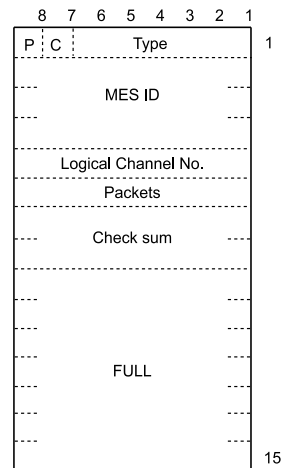
The signalling channel is based on the frame length of 8.64 seconds. Each frame is divided into 28 slots and the transmission rate for a burst within a slot is 1200 symbols/s for second generation satellite. There are two types of access to the signalling channel: reserved and unreserved. For reserved access the slot that is to be used by the MES is pre-allocated by the LES (Bulletin Board). For unreserved access the MES selects slot(s) unreserved for data transmission.



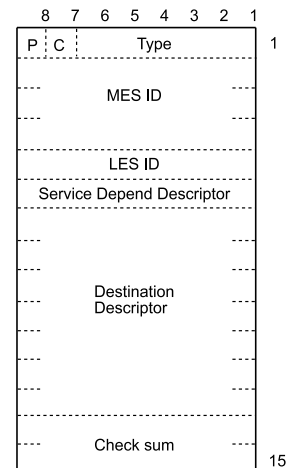
(2nd Generation Satellite, 1200 symbols per second)

Fig. AP1.3.2 Signalling Channel Frame Format

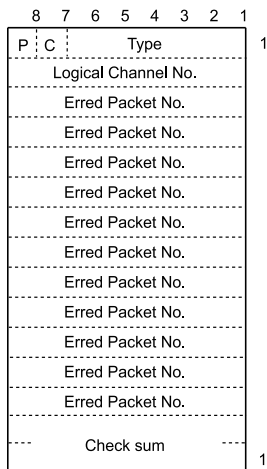
	Packet	Destination
1	Acknowledgement	LES
2	Announcement Response	LES
3	Assignment Response	LES
4	Clear	LES
5	Data Report	NCS & LES
6	Distress Alert	NCS & LES
7	Distress Alert Test	LES
8	MES Forced Clear	NCS & LES
9	Login Request	NCS
10	Logout Request	NCS
11	Message Status Request	NCS & LES
12	Test Request	NCS
13	Test Result Acknowledgement	LES
14	Transfer Status Request	NCS & LES
15	Assignment Request	NCS & LES



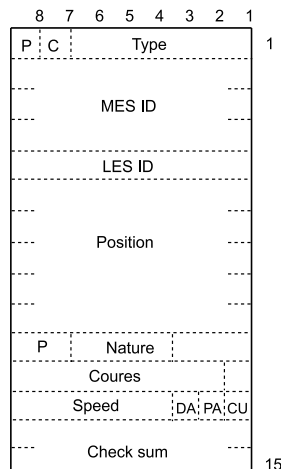
3. Assignment Response



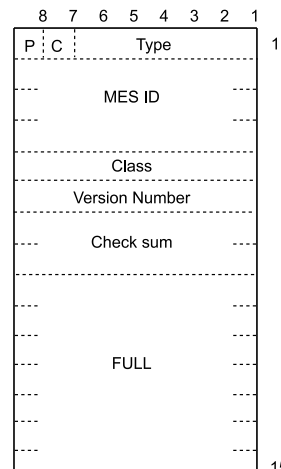
15. Assignment Request



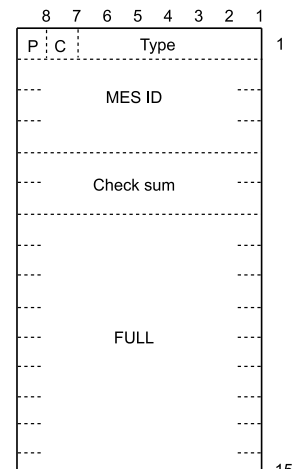
1. Acknowledgement



6. Distress Alert



9. Login Request



10. Logout Request

Note)

P: Priority (Distress/Normal)

C: Continuation (Last packet in sequence, Another packet to follow)

Type: Packet type

Logical Channel No.: Communication Channel

Fig. AP1.3.3 Signaling Channel Packet Formats

3. MES Message Channel

The message channels operate in TDMA mode and are controlled by the LES. Message channels are used by MESs to transfer messages to an LES. Each LES has one or more message channels assigned to it by the NCS.

Allocation of a message channel to an MES is performed by the LES using assignment packets. Each message channel may be used by several MESs simultaneously engaged in From-Mobile calls.

The message channel is quasi-continuous mode with variable frame duration depending on the length of the message to be transferred.

A maximum frame length is 640 bytes or 5 packets. The first packet of a message contains a message header, destination address and message data. The remaining packets contain message data only. It takes 8.64 seconds to send 5 packets or one frame. The message can be up to 32k bytes, that is, about 50 frames can be sent consecutively.

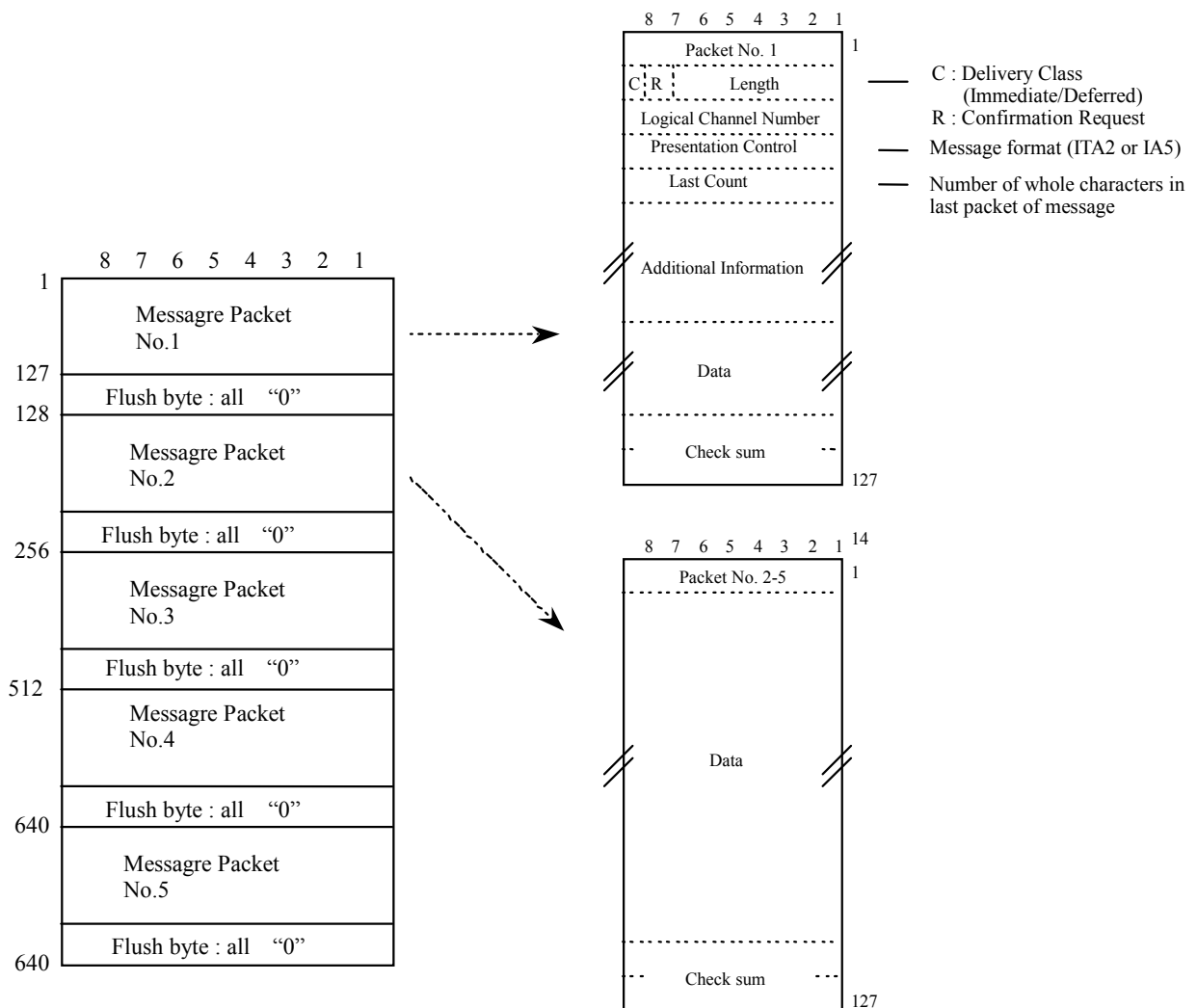


Fig. AP1.3.4 Message Channel

AP1.3.2 Signal Processing

1. Signal processing Flow for Each Channel

Messages are processed on each channel as below.

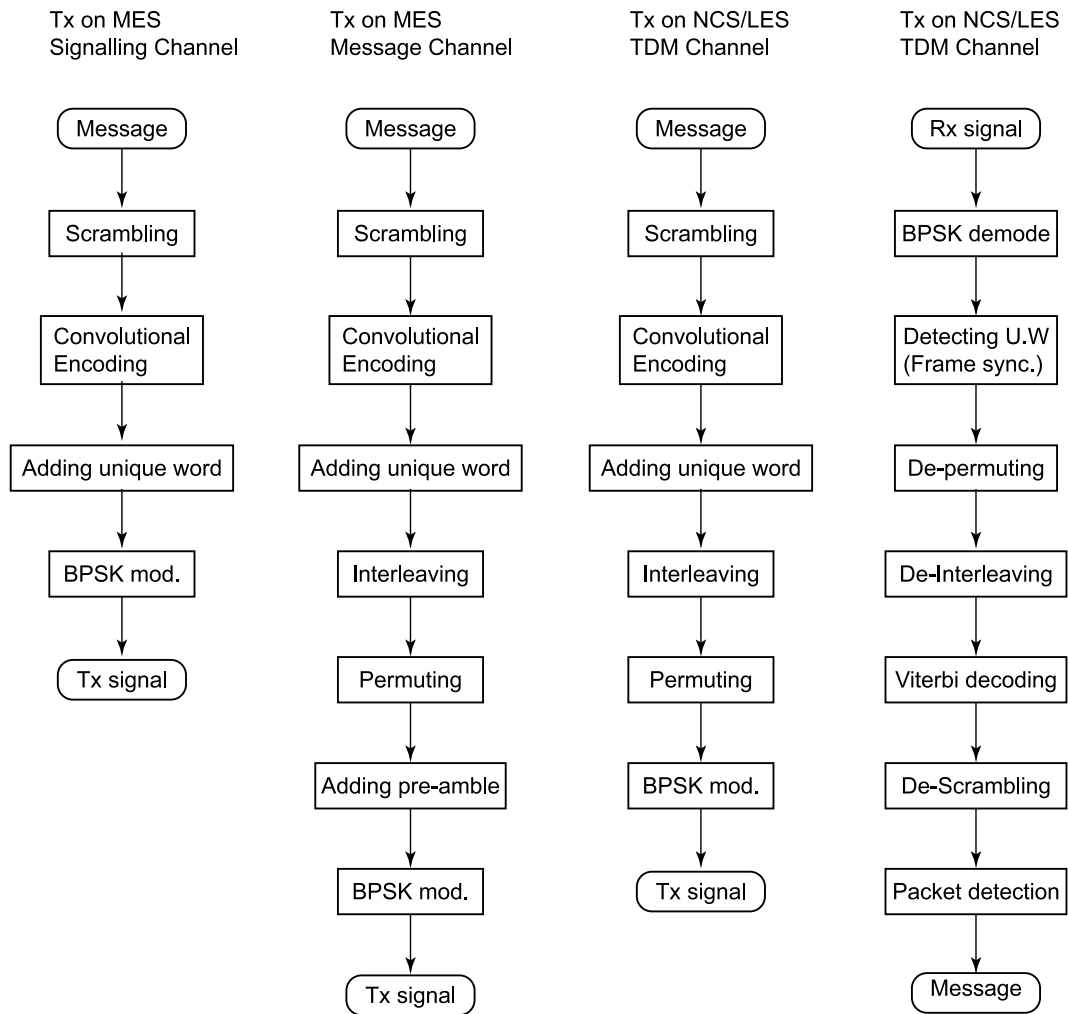


Fig. AP1.3.5 Signal processing Flow for Each Channel

Scrambling

Scrambling prevents 0 or 1 from continuing excessively; if 0 or 1 continues, clock recovery would be reduced at the BPSK modulator. For scrambling, the output is gained by inputting to the output from the scramble generator and the modulo-2 adder (exclusive OR).

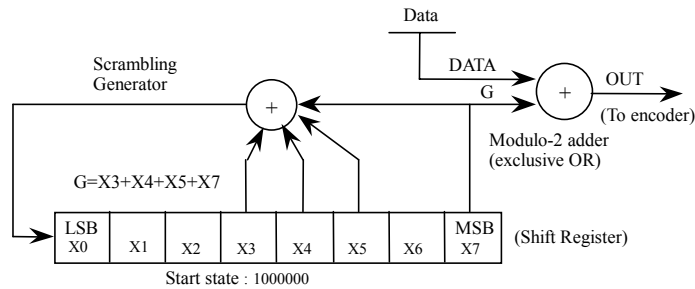


Fig. AP1.3.6 Scrambling

Convolutional Encoding

The convolutional encoding is a method that the receiving side controls to decrease the random error occurred at the communication path so that the redundancy bit is added to the data bit. The convolutional encoder used by the Inmarsat C consists of the 7 bits shift register (constraint length-7) and two modulo-2 adders (exclusive OR). The scrambled bit string is output as the half-rate coded symbols.

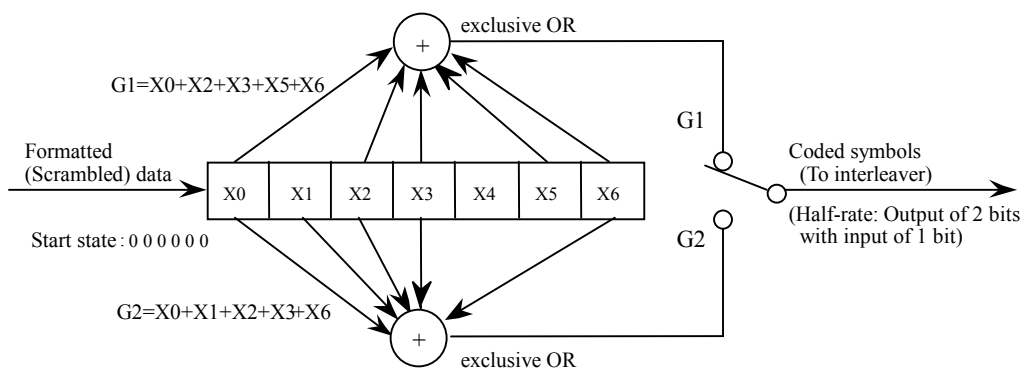


Fig. AP1.3.7 Encoding

Unique Word

The 252 symbols from the encoder are affixed with an unique word (uw) to be used for bit synchronization at the recorder. The uw is 64 bits in length on the MES signaling channel and 64x2 bits on the NCS/CES TDM channel.

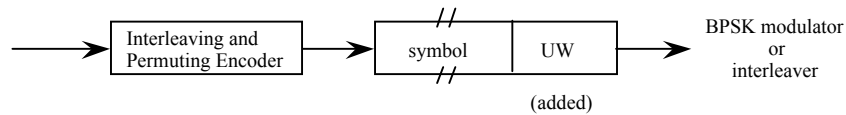


Fig. AP1.3.8 UW

Interleaving and Permuting Encoder

The figure below shows the interleave matrix, consisting of 64 rows by 162 columns. Symbol data comes in column by column. Note that columns 0 and 1 are filled with unique words.

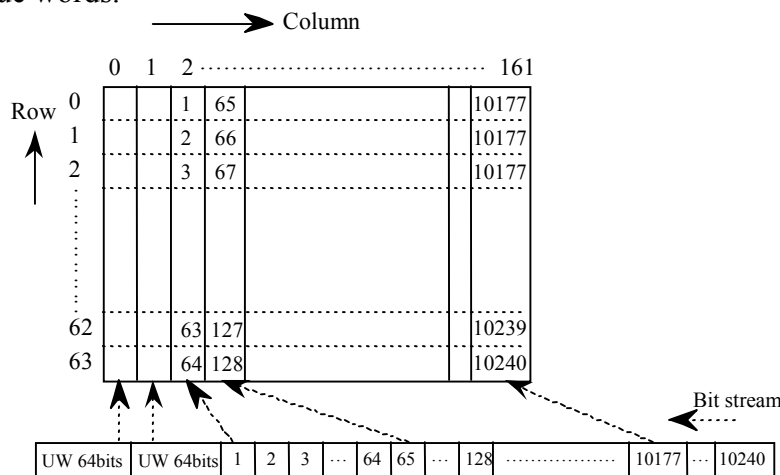


Fig. AP1.3.9 Interleave Matrix

The first 64 symbols of convolutional encoder output go to column 2, rows 0 to 63. The next 64 symbols to column 3, rows 0 to 63 and so on.

The interleave block is transmitted on a row by row basis. The symbols in a row are transmitted in ascending order of column position; that is, the two identical unique word symbols are transmitted first. However, rows are not transmitted in a sequential order; they are transmitted according to a permuted sequence. If the rows in the interleave block are numbered from $i = 00$ to $i = 63$ sequentially and the transmitted order is from $j = 0$ sequentially through to $j = 63$; then, i and j are related by

$$i = (j \times 39) \text{ modulo } 64$$

$$1 \text{ st output } j = 0 : i = (0 \times 39) \text{ modulo } 64 = 0$$

$$2 \text{ st output } j = 1 : i = (1 \times 39) \text{ modulo } 64 = 39$$

$$3 \text{ st output } j = 2 : i = (2 \times 39) \text{ modulo } 64 = 14$$

Modulo 64 is the remainder of division by 64.

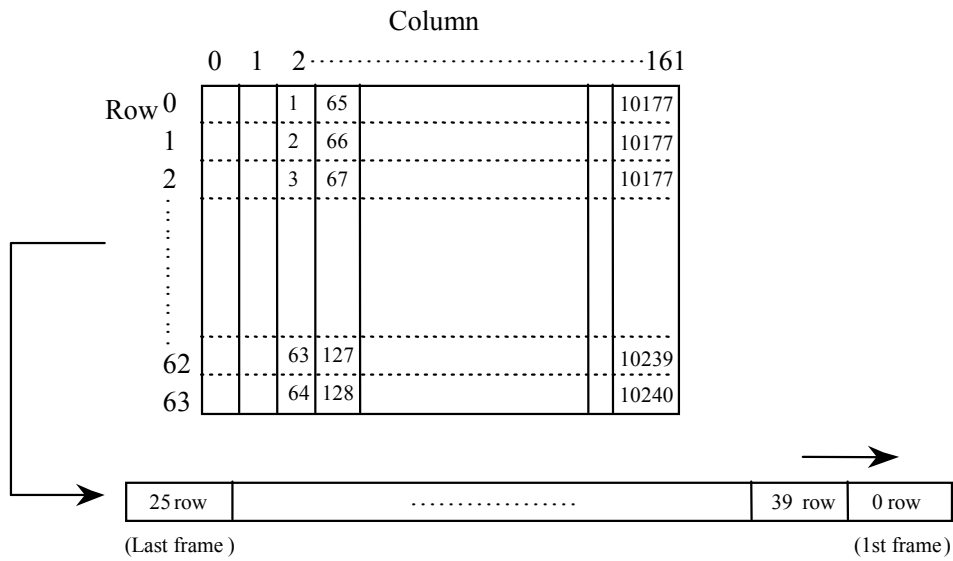


Fig. AP1.3.10 Permuting

Preambling

For easy synchronization at the receiving side, the preamble is added to the top of the message channel data. Preamble consists of the carrier recovery (128 bits) and the clock regeneration (64 bits).

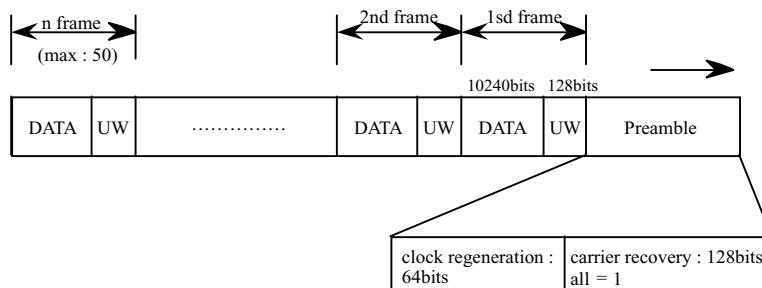


Fig. AP1.3.11 Preambling

BPSK Modulation

BPSK is a kind of phase modulation using a digital signal. Depending on carrier phase difference, BPSK is expressed as 0 or 1. Data signal “0” is not phase shifted; data signal “1” is phase shifted 180 degrees. DDS of Nera C is for the BPSK modulation.

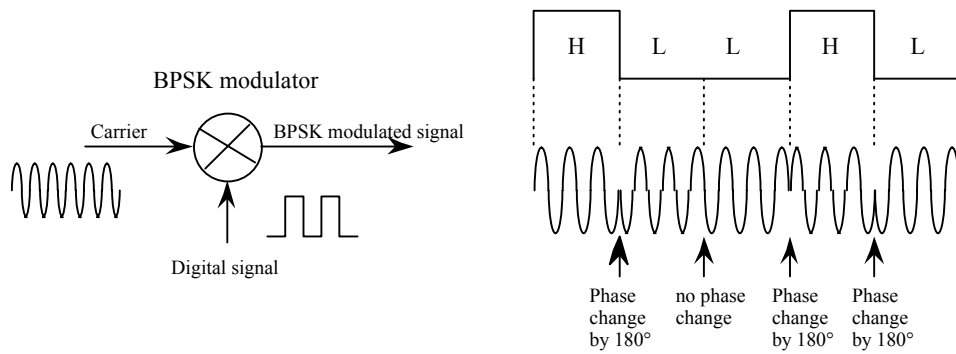


Fig. AP1.3.12 BPSK Modulation

Frame synchronization

Detects a unique word to synchronize to the frame signal.

De-permuting

Demodulated signal is de-permuted and input to the interleave matrix.

De-interleaving

Reassembles the message in the interleave matrix.

Viterbi Decoding

Decodes the viterbi-encoded signal. If any error is found, it is automatically corrected. The burst error is also corrected by combining with the interleaving.

De-scrambling

Scrambled signal is decoded.

Appendix 2) Menu Tree

AP2.1 Menu Tree

Table below shows the menu list. Factory-default is screened.

Table AP2.1 Menu List

Function	Menu-1	Menu-2	Menu-3	Menu-4
F1: File	1. New (<i>Alt + N</i>)			
	2. Open (<i>Alt + O</i>)			
	3. Close (<i>Alt + Q</i>)			
	4. Save (<i>Alt + S</i>)			
	5. Delete (<i>Alt + D</i>)			
	6. Rename			
	7. Print (<i>Alt + P</i>)			
	8. Format Disk	2HD(1.44 MB) 2DD(720 kB)		
	9. MIME (Decode)	(<i>Select file</i>)		
F2: Edit	1. Cut (<i>Del</i>)			
	2. Copy (<i>Alt + C</i>)			
	3. Paste (<i>INS</i>)			
	4. Insert (<i>with Citation</i>)			
	5. Select All (<i>Alt + A</i>)			
	6. Serch or Replace	1. Search (<i>Alt + F</i>)	Search Word	
			Direction	Forward Back
		2. Replace (<i>Alt + R</i>)	Search Word	(<i>Enter Search Word</i>)
			Replace Word	(<i>Enter Replace Word</i>)
			Direction	Forward Back
			Query or All	Query All
	7. Go to Line	1. Top of Text (<i>Home</i>)		
		2. End of Text (<i>End</i>)		
		3. Go to Line	Line No.	(<i>Enter Line No.</i>)
	8. Time or Pos. Ins.	1. Time		
		2. Position		
	9. Change Window (<i>Alt + V</i>)			

Note: () in the table shows the short cut key. For example, when the short cut key is (Alt + o), press [o] while holding [Alt] to open the file.

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F3: Transmit	1. Transmit Message	Priority	Normal	
			Distress	
		Message File	Select File	(Select file)
		Station Name	Select Station	(Select Station)
		Destination Type	Distention Type	TELEX
				FAX
				E-Mail
				CSDN
				PSDN
				X400
				DNID
				SPEC
				TELEX (Prefixed)
				FAX (Prefixed)
				PSDN (Prefixed)
				X400 (Prefixed)
				DNID (Prefixed)
				SPEC (Prefixed)
			Prefix code (When Prefixed item is selected in Destination Type menu.)	(Enter 2 digits)
			Country/Ocean Code	(Enter max. 4 digits)
			Station ID	(Enter max. 15 digits)
			Mode Type (When FAX or FAX (Prefixed) is selected in Destination Type menu.)	T30 FAX
				V21 V.21 300 bps Duplex
				V22 V.22 1200 bps Duplex
				V22B V.22bis 2400 bps Duplex
				V23 V.23 600/1200b ps
				V26B V.26bis 2400/1200 bps
				V26T V.26ter 2400 bps Duplex
				V27T V.27ter 4800/2400 bps
				V32 V.32 9600 bps Duplex
				Other

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F3: Transmit	1. Transmit Message	Destination Type	Address (When E-Mail is selected in Destination menu.)	(Enter E-mail address: max. 60 char.)
			Subject (When E-Mail is selected in Destination menu.)	(Enter Subject: max. 60 char.)
			Attach File (When E-Mail is selected in Destination menu.)	(Select Attach file)
		LES ID	Select LES (Except E-mail and DNID)	(Select LES)
		Option	Confirmation	ON OFF
			Send Delay	(Enter 00:00 to 99:59)
			Delivery Delay	Immediate Deferred
			Code	IA5 ITA2 DATA
			Transmit	Yes No
	2. Cancel	(Select Transmitted Message)		
	3. Request Delivery Status	(Select Transmitted Message)		
F4: EGC	1. Display EGC Message	(Select EGC Message)		
	2. EGC Network ID			
F5: Reports	1. Data Report	1. Data Report 2. Data Report 3. Data Report 4. Data Report	Status	ON OFF
			Report Length	1 2 3
			Destination	DNID LES ID Member No.
			Activation	Regular Interval Daily
			Interval Time (When Regular Interval is selected in Activation menu.)	(Enter 00:00 to 99:59)

(Cont'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F5: Reports	1. Data Report	1. Data Report 2. Data Report 3. Data Report 4. Data Report	Report Time (When Regular Interval is selected in Activation menu.)	(Enter 1 to 999)
				No Limit
			Start Time 1 (When Daily Interval is selected in Activation menu.)	(Enter 00:00 to 24:00)
			Start Time 2 (When Daily Interval is selected in Activation menu.)	(Enter 00:00 to 24:00)
			Start Time 3 (When Daily Interval is selected in Activation menu.)	(Enter 00:00 to 24:00)
			Start Time 4 (When Daily Interval is selected in Activation menu.)	(Enter 00:00 to 24:00)
	2. Message Report	1. Message Report 2. Message Report 3. Message Report 4. Message Report	PIN Code	(Enter PIN code: max. 8 characters.)
			Status	ON
				OFF
			Station Name	Select Station
			Destination Type	TELEX
				FAX
				E-Mail
				CSDN
				PSDN
				X400
				DNID
				SPEC
				TELEX (Prefixed)
				FAX (Prefixed)
				PSDN (Prefixed)
				X400 (Prefixed)
				DNID (Prefixed)
				SPEC (Prefixed)
			Prefix code (When Prefixed code is selected in Destination Type menu.)	(Enter 2 digits)

(Cont'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F5: Reports	2. Message Report	1. Message Report 2. Message Report 3. Message Report 4. Message Report	Country/Ocean Code	(Enter code: max. 4 digits)
			Station ID	(Enter ID: max. 15 digits)
			Mode Type (When FAX or FAX (Prefixed) is selected in Destination Type menu.)	T30 FAX
				V21 V.21 300 bps Duplex
				V22 V.22 1200 bps Duplex
				V22B V.22bis 2400 bps Duplex
				V23 V.23 600/1200 bps
				V26B V.26bis 2400/1200 bps
				V26T V.26ter 2400 bps Duplex
				V27T V.27ter 4800/2400 bps
				V32 V.32 9600 bps Duplex
				Other
			Address (When E-Mail is selected in Destination Type menu.)	(Enter E-Mail Address: max. 60 char.)
			Subject (When E-Mail is selected in Destination Type menu.)	(Enter Subject: max. 60 char.)
			LES ID	(Select LES)
			Activation	Regular Interval
				Daily
			Interval Time (When Regular Interval is selected in Activation menu.)	(Enter time: 00:00 to 99:59)
			Report Times (When Regular Interval is selected in Activation menu.)	(Enter times: 1 to 999)
				No Limit
			Start Time 1 (When Daily is selected in Activation menu.)	(Enter time: 00:00 to 24:00)
			Start Time 2 (When Daily is selected in Activation menu.)	(Enter time: 00:00 to 24:00)
			Start Time 3 (When Daily is selected in Activation menu.)	(Enter time: 00:00 to 24:00)
			Start Time 4 (When Daily is selected in Activation menu.)	(Enter time: 00:00 to 24:00)

(Cont'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F5: Reports	2. Message Report	1. Message Report 2. Message Report 3. Message Report 4. Message Report	Report Contents File (When FILE is selected in Report Contents menu.)	NAV
				NAV + SEA INF
				NAV(R)
	3. Data Network ID			FILE
				(Select File)
F6: Logs	1. Send Message Log	(Select Transmitted Message)		
	2. Receive Message Log	(Select Received Message)		
	3. EGC Log	(Select EGC Message)		
	4. Log			
F7: Option	1. Log in	Yes		
		No		
	2. Log out	Yes		
		No		
	3. Abort	Yes		
		No		
	4. Select NCS	AOR (WEST)		
		AOR (EAST)		
		POR		
		IOR		
	5. Ocean Region	Auto	Yes	
			No	
		West-Atlantic	Yes	
			No	
		East-Atlantic	Yes	
			No	
		Pacific	Yes	
			No	
	6. LES Information	Indian	Yes	
			No	
		1. PV Test	Yes	
			No	
		2. PV Test Result		
		3. Self Test	Yes	
			No	
		4. Distress Alert Button Test	Yes	
			No	

(Cont'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F8: Set up	1. Distress Alert Setup	LES ID	Select LES	
		Update Time	00:00 to 23:59	
		Position	LAT	
			LON	
		Protocol	Maritime (<i>Fixed</i>)	
		Nature	Undesignated	
			Fire/Explosion	
			Flooding	
			Collision	
			Grounding	
			Listing	
			Sinking	
			Disabled & Adrift	
			Abandoning ship	
			Further assistance required	
			Piracy or Armed attack	
		Course	0 to 999	Note) Invalid data: 999
		Speed	0 to 99	Note) Invalid data: 99
	2. System Setup	System Date & Time	(Indication only)	
		IMN	(Enter IMN)	Re-enter) Type "IMN" while holding [ALT]+[Ctrl].
		MES Operation Mode	INMARSAT C	
			EGC	
		NAV Port	OFF	
			EXT	
			INT	
		Active Port	INT	
			ALL	
		Message Output Port (When ALL is selected in Active port.)	INT	
			EXT	
			INT+EXT	
			AUTO	
		EGC Output Port (When ALL is selected in Active Port.)	INT	
			INT+EXT	

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F8: Set up	2. System Setup	Network - Network	IP Address (When OFF is selected in DHCP.)	
			Subnet mask (When OFF is selected in DHCP.)	
			DHCP	ON OFF
			Gateway	
		Network - Mail Gateway	Attach	UUENCODE BINARY
			Delivery To	PC Mailer Server
			Server IP (When Server is selected in Delivery To.)	
			Address Mode (When Server is selected in Delivery To.)	FIXED Auto
			Mail Address (When Server is selected in Delivery To, and FIXED is selected in Address Mode.)	
			Auto Delivery Keyword (When Server is selected in Delivery To, and Auto is selected in Address Mode.)	
		Command Window - JOB; NERASERVICE - Password; Nera C	1. Remote Box Setup	1. DMC ON/OFF
				2. IC-305 ON/OFF
				3. IC-306-1 ON/OFF
				4. IC-306-2 ON/OFF
				5. IC-306-3 ON/OFF
				E: EXT
			2. Internal GPS Setup	1. Data Output Interval (01 – 30) E: EXT

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F8: Set up	3. Editor Setup <i>(At closed file.)</i>	Text Mode	Telex	
			Ascii	
		Edit Mode	Insert	
			Overwrite	
		Word Wrap	ON	
			OFF	
		Line No.	ON	
			OFF	
		Tab Wide	2 Char	
			4 Char	
			8 Char	
		Column Width <i>(When Ascii is selected in Text Mode.)</i>	Max. 80	
	4. Terminal Setup	Cursor Type	Block	
			Underline	
		Scroll	Full Screen	
			Half Screen	
		Date Disp. Form	YY – MM - DD	
			MMM - DD - YY	
			DD - MMM - YY	
		Currency Unit	SDR	
			US\$	
			EUR	
			YEN	
			OTHER	<i>(Enter Currency: max. 4 characters)</i>
		Screen Saver	ON	
			OFF	

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F8: Set up	4. Terminal Setup	Window Color	Window Color Setup	Window - <i>Base Window</i> - <i>RCV Message Display</i> - <i>EGC Message Display</i> - <i>EDIT1</i> - <i>EDIT2</i> - <i>Function</i> - <i>SUB Menu1</i> - <i>SUB Menu2</i> - <i>SUB Menu3</i> - <i>SUB Menu4</i> - <i>Message</i>
				For Color - <i>YELLOW</i> - <i>MAGENT</i> - <i>RED</i> - <i>CYAN</i> - <i>BLACK</i> - <i>L-WHITE</i> - <i>L-MAGENT</i> - <i>L-RED</i> - <i>L-CYAN</i> - <i>L-GREEN</i> - <i>L-BLUE</i> - <i>GRAY</i> - <i>WHITE</i> - <i>BROWN</i>
				Back color - <i>L-WHITE</i> - <i>L-MAGENT</i> - <i>L-RED</i> - <i>L-CYAN</i> - <i>L-GREEN</i> - <i>L-BULE</i> - <i>GRAY</i> - <i>WHITE</i> - <i>BROWN</i> - <i>MAGENT</i> - <i>RED</i> - <i>CYAN</i> - <i>GREEN</i> - <i>BLUE</i> - <i>BLACK</i>
		Default Color	Yes No	

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F8: Set up	5. EGC Setup	Receive EGC Area	Additional Position	(Enter 1 pos.)
			Navarea	(Enter area: max. 9)
			Fixed Area	(No need)
			Way point	ON
				OFF
		NAVTEX	Station Code	A-Z
			Ice Report	ON
				OFF
			Meteo. forecasts	ON
				OFF
			Pilot service	ON
				OFF
			DECCA message	ON
				OFF
			LOLAN message	ON
				OFF
			OMEGA message	ON
				OFF
			SAT NAV message	ON
				OFF
			Other navaid msg	ON
				OFF
			QRU(no message)	ON
				OFF
	6. Auto Mode Setup	Auto Log Print	ON	
			OFF	
		Receive Alarm	ON	
			OFF	
		Auto Receive Message Save	ON	
			OFF	
		Auto Receive Message Print	ON	
			OFF	
		Data Report & Polling Print	ON	
			OFF	

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F8: Set up	6. Auto Mode Setup	Auto EGC Message Save	System	ON
				OFF
			Fleet NET	ON
				OFF
			Safety NET (Routine)	ON
				OFF
		Auto EGC Message Print	Safety NET (Safety)	ON
				OFF
			Safety NET (Urgency & Distress)	ON
				OFF
			System	ON
				OFF
			Fleet NET	ON
				OFF
			Safety NET (Routine)	ON
				OFF
			Safety NET (Safety)	ON
				OFF
	7. E mail Setup	Select station		
	8. Directories	Message Directory	Select Directory	
		EGC Message Directory	Select Directory	
	9. Configuration	1. Station List (Max. 99 stations)	Station Group	(Enter Group: max. 5 characters)
			Station Name	(Enter Name: max. 15 characters.)
			Destination Type	TELEX
				FAX
				E-Mail
				CSDN
				PSDN
				X400
				DNID
				SPEC
				TELEX (Prefixed)
				FAX (Prefixed)
				PSDN (Prefixed)
				X400 (Prefixed)
				DNID (Prefixed)
				SPEC (Prefixed)

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F8: Set up	9. Configuration	1. Station List (Max. 99 stations)	Prefix code (When Prefixed code is selected in Destination Type menu.)	(Enter code: 2 digits)
			Country/Ocean Code	(Enter code: max. 4 digits)
			Station ID	(Enter ID: max. 15 digits)
			Modem Type (When FAX or FAX (Prefixed) is selected in Destination Type menu.)	T30 (FAX)
				V21 V.21 300 bps Duplex
				V22 V.22 1200 bps Duplex
				V22B V.22bis 2400 bps Duplex
				V23 V.23 600/1200 bps
				V26B V.26bis 2400/1200 bps
				V26T V.26ter 2400 bps Duplex
				V27T V.27ter 4800/2400 bps
				V32 V.32 9600 bps Duplex
				Other
			E-mail Address (When E-Mail is selected in Destination Type menu.)	(Enter E-mail Address: max. 60 characters)
			Remark	(Enter Remark: max. 20 characters)
		2. LES List (Max. 64 stations x 4)	Name	(Enter Name: max. 15 characters)
			ID	(Enter 3 digits)
			Remark	(Enter Remark: max. 20 characters)
			Charge	TELEX
				FAX
				E-Mail
				CSDN
				PSDN
				X400
				DNID
				SPEC
		3. EGC channel List	(Max. 4 ch x 4)	
		4. NCS Channel List	(Max. 20 ch x 4)	

(Con'd)

Function	Menu-1	Menu-2	Menu-3	Menu-4
F8: Set up	9. Configuration	5. E-mail Service List (Max. 16 stations)	Service Station Name	(Enter name: max. 19 characters)
			Service ID	(Enter ID: max. 9 characters)
			LES ID (AORW)	(Enter LES ID)
			(AORE)	(Enter LES ID)
			(POR)	(Enter LES ID)
			(IOR)	(Enter LES ID)
			To:	(Enter To: max. 9 characters)
			Cc:	(Enter Cc: max. 9 characters)
			Subject:	(Enter Subject: max. 9 characters)
			Separator	(Enter Separator: max. 9 characters)
		6. Save/Load	Attach File (MIME)	OFF
				ON (BASE64)
				ON (UUENCODE)
			Save to FD	1. ALL
				2. Station list
				3. LES List
				4. E-Mail Service List
				5. Other
			Load from FD	1. ALL
				2. Station list
				3. LES List
				4. E-Mail Service List
				5. Other
F9: Position	LAT			
	LON			
F10: Stop Alarm				

Appendix 3) Coast station service list

AP3.1 Inmarsat C coast station service list

The table below lists the coast station service.

19th April 2002

Land earth station operator	Country	AOR- E	AOR- W	IOR	POR
Beijing Marine	China			311	211
Bezeq	Israel	127		327	
CAT	Thailand			319	
CP Radio Marconi	Portugal	118			
Embratel	Brazil	114			
France Telecom	France	121	021	321	221
France Telecom (Ex DeteSat)	France	115		333	
KDDI	Japan	103	003	303	203
Korea Telecom	South Korea			308	208
Morviasputnik (Nudel Les)	Russia	117		317	
OTE	Greece	120		305	
Polish Telecom	Poland	116		316	
Saudi Telecom Co	Saudi Arabia	125		325	
Singapore Telecom	Singapore			328	210
Stratos Mobile Networks	Canada	102	002	302	202
Telecom Company of Iran	Iran			314	
Telecom Italia	Italy	105		335	
Telenor Satellite Services Inc	USA	101	001		201
Telenor Satellite Services AS	Norway	104	004	304	204
Turk Telecom	Turkey	110		310	
Vishipel	Vietnam			330	
VSNL	India			306	
Xantic	Netherlands	112	012	312	212
Xantic	Australia	122	022	322	222

Nera C incorporates e-mail protocols, POP3 and SMTP. Connected to a LAN via the Ethernet (10Base-T) port, the PC in the network can send and receive e-mail via Nera C. Nera C having the following programs supports commercial PC e-mail application such as Outlook Express.

TERM CPU : 1650162-01.04 and above

RFCOM CPU : 1650159-01.04 and above

AP4.1 Features

- 1) DHCP
Network administrators manage centrally and automate the assignment of IP configurations on a computer network.
- 2) Gateway
Received mail is transferred to the specific mail server.
- 3) Address Mode
Received mail which contains a keyword can be forwarded to the mail address which appears just after the keyword in a message.
- 4) SMTP Enable IP Address
A specific PC in a network can send mail.
- 5) Attach
MIME encoded mail from a PC in the network is automatically decoded in UNENCODE or BINARY format.
- 6) Send Limit Size
Maximum outgoing message size (Up to 32 KB) is set for the PC client.

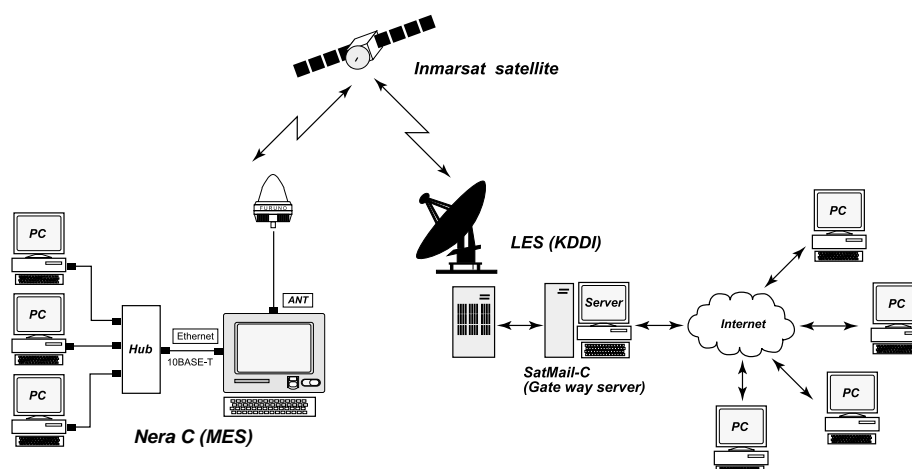


Fig. AP4.1.1 EX)Network connection

AP4.2 Limitations

Unlike e-mail software on the PC, Nera C e-mail software;

- 1) Can send up to 32 e-mails at a time or continuously. Succeeding e-mail must be transmitted after the completion of the previous one.
- 2) Allows you to enter up to 60 characters in "Subject" line. Use half-size of letter and characters for "Subject" line.
- 3) Can send a message of which line does not exceed 1,000 characters.
- 4) Can send a mail up to 10 addresses.
- 5) Does not have "Bcc" field. Nera C changes "Bcc" field to "Cc" field before transmission.

AP4.3 Precautions

- 1) Use "Text" format. "HTML" format increases message size, resulting in higher communication charge.
- 2) Use 7-bit character code (half-size of letters and characters). Some LESs cannot handle 8-bit characters. Refer to page AP4-34 for characters which the e-mail can contain.
- 3) Set the minimum time interval (2 to 5 minutes) to check for new messages on a regular basis. Nera C can store received messages up to 32 KB. New data overwrites the oldest one.
- 4) Note that Nera C e-mail does not feature e-mail account management.
- 5) Communication log printed out includes sending and receiving e-mails from PCs in the network.
- 6) Add the name of the attachment in the message. Some LES deliver the e-mail and attachment separately. And the file name of the attachment is always ATTCH.DAT.
- 7) Note that when the attachment is received separately from the mail, it is not delivered to the mail address specified by a keyword, but to "Mail Address".

AP4.4 Network Setup menu

The table below lists items in “Network Setup”, a sub-menu in “System Setup”.
(Keystroke: [F8][2])

Table AP4.4.1 Network Setup menu

Network	IP Address	Use when DHCP is “OFF”.
	Subnet mask	Use when DHCP is “OFF”.
	DHCP	ON
	Gateway	Use when DHCP is “OFF”.
Mail gateway	SMTP Enable IP Address	
	Send Limit Size (KB)	2, 4, 6, 8, 10, 16, 32
	Attach	UUENCODE
		BINARY
	Delivery To	PC Mailer
		Server
	Server IP	
	Address Mode	FIXED
		Auto
	Mail Address	
	Mail Address Keyword	Set when “Address Mode” is “Auto”.

Network

IP Address/Subnet Mask (See page AP4-9.)

Use when DHCP is OFF.

“172.31.16.1” and “255.255.0.0” are entered respectively at factory.

DHCP (Dynamic Host Configuration Protocol) (See page AP4-14.)

Set to ON when IP address is automatically assigned from DHCP server.

Gateway (See page AP4-16.)

Enter IP address of Default Gateway (Router) when Nera C is connected to other network.

Mail Gateway

SMTP Enable IP Address (See page AP4-15.)

Enter IP address of the PC from which e-mail is sent. If IP address is not specified here, all PCs connected to the LAN can send e-mail. All PCs can receive e-mail.

Send Limit Size (KB) (See page AP4-20.)

Choose the size of outgoing messages among 2, 4, 6, 8, 10, 16, and 32.

Attach (See page AP4-21.)

Select the attachment file type to UNENCODE.

Delivery To: PC Mailer/Server (See page AP4-16.)

- PC Mailer : Received messages are sent to the PC in the LAN.
- Server : Received messages are sent to the mail server.

Server IP

When Nera C is connected to the mail server in the LAN, enter IP address of the mail server.

Address Mode (See page AP4-18.)

- Fixed : The received message is sent to the address designated by “Mail Address”.
- Auto : The received message is forwarded to the address which appears just after the keyword in the message. When the keyword is not found, the message is sent to the address set in “Mail Address”.

Mail Address (See page AP4-18.)

Enter the mail address to be sent when “Address Mode“ is set to “FIXED” or the keyword is not found if “Address mode” is set to “Auto.

Mail Address Keyword (See AP4-18.)

Enter the keyword (up to 15 character long) if “Address mode” is set to “Auto. The search of the keyword are made regardless of upper- and lower-case letters.

AP4.5 Setting LES

The message is sent via “E-Mail Station” selected on Nera C and received by providers supported by each area.

Procedure

1. Press [F8][7] to select “E-Mail Setup”.

LES Name		AOR.W	AOR.E	POR	IOR
01	Telenor S.S.Inc	001	101	201	321

2. Press [Enter] to show “E-Mail Setup”.

	LES Name	AOR.W	AOR.E	POR	IOR
01	Telenor S.S.Inc	001	101	201	321
02	Xantic (NED)	012	112	212	312
03	Stratos M.N.	002	102	202	302
04	Telenor S.S.AS	004	104	204	304
05	KDDI	003	103	203	303
06	Singapore T.			210	328

3. Select an LES to send e-mail, followed by [Enter].

4. Press [Esc] twice.

Adding LES

To add new LES into “E-Mail Service List”, follow the procedure below.

1. Press [F8][9] to show “Configuration” menu.

2. Press [5] to show “E-Mail Service List”.

Setup
Configuration

E-Mail Service List

	LES Name	AOR.W	AOR.E	POR	IOR
01	Telenor S.S.Inc	001	101	201	321
02	Xantix (NED)	012	112	212	312
03	Stratos M.N.	002	102	202	302
04	Telenor S.S.AS	004	104		304
05	KDDI	003	103	203	303
06	Singapore T.			210	328
07					
08					

3. Press [↓] to the blank line in “E-Mail Service List”, and press [Enter].

4. Press [Enter] to show “Service LES Name”.

Service LES Name []

Service ID

LES ID(AORW)

(AORE)

(POR)

(IOR)

To:

Cc:

Subject:

Separator

Attach File(MIME) OFF

5. Enter new LES name, followed by [Enter].

6. Select “Service ID” and enter the service ID (Special Access Code), followed by [Enter].

7. Select “LES ID” and enter “LES ID” in “AOR-West”, “AOR-East”, “POR” and “IOR”, followed by [Enter].

8. Move the cursor to “To:” and complete “To:” line. (for example, TO:, to+, etc)

9. Move the cursor to “Cc:” and complete “Cc:” line. (for example, CC:, cc+, etc)

10. Move the cursor to “Subject:” and complete “Subject:” line. (for example, Subject:, subject+, etc)

11. Move the cursor to “Separator” and enter corresponding character and mark. (for example, blank space, STX:, etc)

12. Move the cursor to “Attach File (MIME)” and then choose among “ON (BASE64)”, “ON (UUENCODE)” and “OFF”.

13. Press [Enter] to close the window.

14. Press [Esc] four times.

When deleting the list,

use [Back Space] to delete the name in “Service LES Name” window, and then press [Enter].

AP4.6 Setting Active Port

Set “Active Port “ and “Message Output Port” in “System Setup” menu to “ALL” and “INT” respectively. (Keystroke: [F8][2]) The received message is saved in Nera C and then transferred to PC.

Procedure

1. Press [F8][2] to show “System Setup” menu.
2. Select “Active Port”.
3. Select “ALL”, followed by [Enter].
4. Select “Message Output Port”.
5. Select “INT”, followed by [Enter].
6. Press [Esc]. The “Update” window appears.
7. Select “Yes”, followed by [Enter] to update the setting.
8. Press [Esc].

Table AP4.6.1 Active Port” and “Message Output Port

Active Port	INT	DTE and LAN ports are inactive.
	ALL	DTE and LAN ports are active.
Message Output Port	INT	Received message is saved in the memory on Nera C.
	EXT	Received message is output from DTE and LAN ports.
	INT+EXT	Received message is saved in Nera C memory and output from DTE and LAN ports at a time.
	AUTO	Received message is output according to Sub Address setting. (Internal memory and LAN: 000; DTE: 001)

AP4.7 Message Log

Nera C handles four message logs; System, Receiving, Attachment and Sending. “To:”, “From:” and “Subject:” lines in the header of each mail appear in the log files as below.

System message log generated by RF CON CPU in Nera includes Log in/out, Successful Send Message, Successful Receiving Message, INF: Update current ship position, etc.

Note that delivery notifications are not provided.

Table AP4.7.1 Message Log

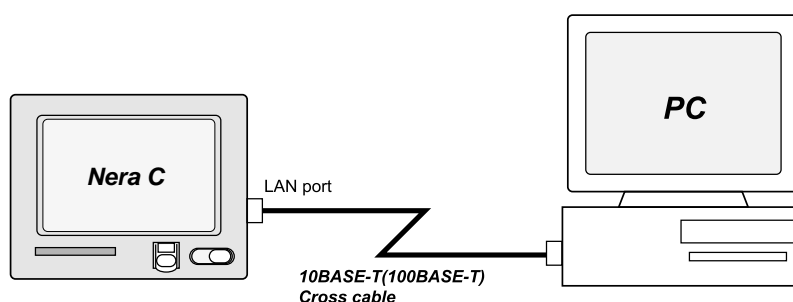
Log type		Display example
System	From	Systemlog@IMN number-nerac
	Subject	System Log Message
Receiving	From	Basically, sender in the original message “text message@INM number-nerac” appears If the line cannot be read.
	Subject	Basically, subject in the original message “Normal message” appears if the line cannot be read.
Attachment	From	Binary message@INM number-nerac
	Subject	InmarsatC Normal Message
Sending	To	Mail address
	Subject	“Subject” typed in

AP4.8 Connection and setting

Contact with the network administrator who knows the network and/or applications on board ship

AP4.8.1 Connection to single PC

Received messages are stored in the Nera C and retrieved by the PC's e-mail client.



1. Parts required

- 10BASE-T or 100BASE-T cross cable
- PC (with LAN port or LAN card)

2. Connection

Connect the LAN port on the terminal unit to the LAN port on the PC with the cross cable.

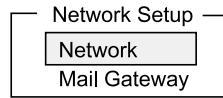
3. Setting on Nera C

Default settings of IP address and subnet mask are as below. Change these values if necessary.

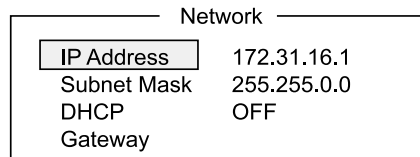
- IP address : 172.31.16.1
- Subnet mask : 255.255.0.0

Procedure

1. Press [F8][2] to open "System Setup" menu.
2. Select [Network Setup], followed by [Enter].



3. Select Network , followed by [Enter].



4. Select "IP Address" , followed by [Enter].
5. Set "IP address" , followed by [Enter].
6. Select "Subnet Mask" , followed by [Enter].
7. Set "Subnet Mask" , followed by [Enter].
8. Press [Esc] to show "Update" .
9. Select "Yes" , followed by [Enter] to update the setting. The message "Press ESC key to Restart Nera C". appears.
10. Press [Esc]. The updating starts automatically.

4. Settings on PC

Perform network settings on the PC. For details refer to the PC's owner's manual.

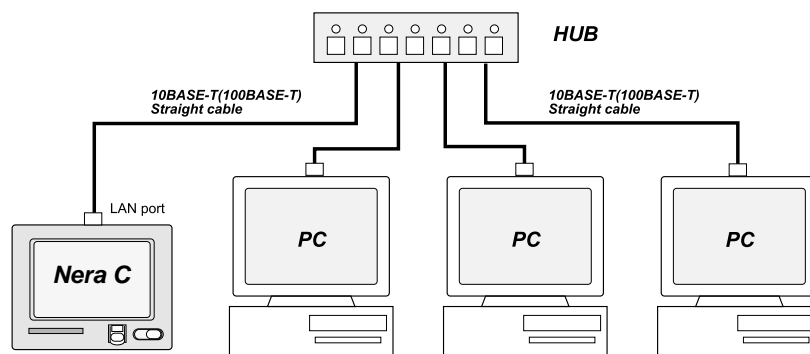
For example)

- IP address : 172.31.16.2
- Subnet mask : 255.255.0.0

After setting, check the connection between Nera C and PC by using "Ping command". See page AP4-32.

AP4.8.2 Connection of multiple PCs

Received messages are stored in the Nera C and retrieved by one of the PCs in the network. Once the message is transferred, it is no longer retrieved. Note) See page AP4-26



1. Parts required

- Hub (When 100BASE-T PC is connected, a switching hub is needed.)
- 10BASE-T or 100BASE-T straight LAN cable
- PC (with LAN port or LAN card)

2. Connection

Using the straight LAN cable, connect Nera C and LAN port on the PC to the Hub.

3. Setting on Nera C

Default settings of IP address and subnet mask are as below. Change these values if necessary.

- IP address : 172.31.16.1 (Default)
- Subnet mask : 255.255.0.0 (Default)

Procedure

Refer page AP4-9 "3. Setting on Nera C" .

4. Setting on PC

Make network settings on the PC. For details refer to the PC's owner's manual.

For example)

- IP address : 172.31.x.x Note)
- Subnet mask: 255.255.0.0

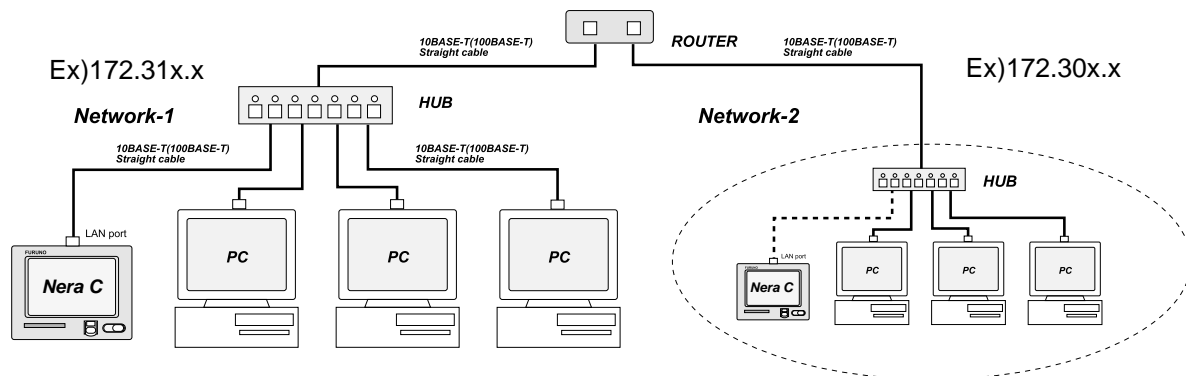
Note)

IP address assigned to the PC is from "172.31.0.1" to "172.31.255.254" except for "172.31.16.1".

After setting, check the connection between Nera C and PC by using "Ping" command. See page AP4-32.

AP4.8.3 Connection to multiple networks

When a gateway (router) is connected to the network, gateway setting is required on Nera C.



1. Parts required

- Hub (When 100BASE-T PC is connected, the switching hub is required.)
- 10BASE-T or 100BASE-T straight LAN cable
- PC (with LAN port or LAN card)
- Router

2. Connection

Refer to the figure above.

3. Setting on Nera C

1) IP address and Subnet mask

Default settings of IP address and subnet mask are as below. Change these values if necessary.

- IP address : 172.31.16.1
- Subnet mask : 255.255.0.0

If the Nera C is connected to other network, the network address is changed accordingly.

Procedure

Refer page AP4-9 "3. Setting on Nera C".

2) Gateway

1. Press [F8][2] to open "System Setup" menu.
2. Select [Network Setup], followed by [Enter].
3. Select "Network", followed by [Enter].
4. Select "Gateway", followed by [Enter].

Network	
IP Address	172.31.16.1
Subnet Mask	255.255.0.0
DHCP	OFF
Gateway	

5. Set "gateway IP address", followed by [Enter].
6. Press [Esc] to show "Update".
7. Select "Yes", followed by [Enter].
8. Press [Esc].

Note)

When the router supports DHCP and IP address is assigned automatically, set DHCP in [Network] menu on Nera C to ON.

Settings on PC

Make network settings on the PC. For details refer to the PC's owner's manual.

- IP address : 172.31.x.x ^{Note 1)}
- Subnet mask : 255.255.0.0

Note 1)

IP address assigned to the PC is from "172.31.0.1" to "172.31.255.254" except for "172.31.16.1".

If the Nera C is connected to other network, the network address is changed accordingly.

Note 2)

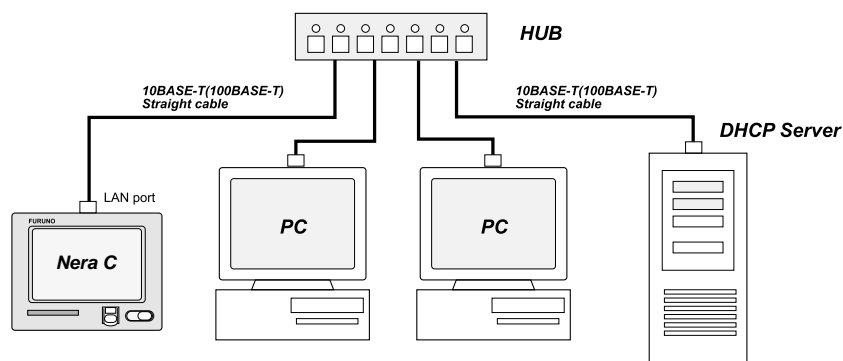
When the router supports DHCP and IP address is assigned automatically, set TCP/IP setting on the PC to Obtain an IP address automatically .

After setting, check the connection between Nera C and PC by using "Ping" command. See page AP4-32.

AP4.9 Function settings

AP4.9.1 DHCP

When a DHCP server is connected to the LAN, IP address and subnet mask are automatically assigned by following steps below.



Procedure

1. Press [F8][2] to open "System Setup" menu.
2. Select "Network Setup", followed by [Enter].
3. Select "Network", followed by [Enter].
4. Select "DHCP", followed by [Enter].

Network	
IP Address	172.31.16.1
Subnet Mask	255.255.0.0
<input type="checkbox"/> DHCP	OFF
Gateway	

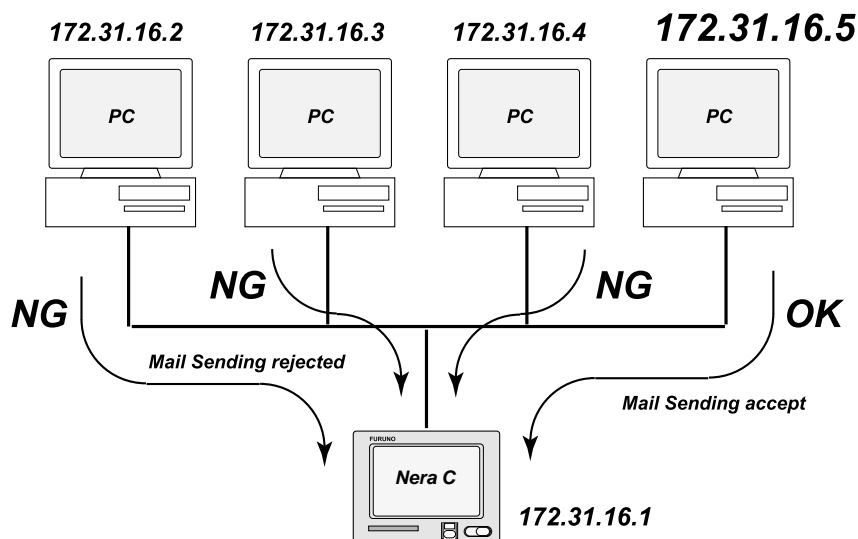
5. Select "ON", followed by [Enter].
6. Press [Esc] to show [Update].
7. Select "Yes", followed by [Enter]. The message "Press ESC key to Restart Nera C." Appears.
8. Press [Esc]. The system automatically restarts and new settings are loaded.
9. Check IP address allocated to Nera C after setting.

After setting, check the connection between Nera C and PC by using "Ping" command. See page AP4-32.

AP4.9.2 SMTP Enable IP Address

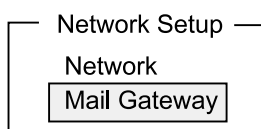
Specify IP address of the PC from which e-mail is sent. If IP address is not specified, all PCs connected to the LAN can send e-mail.

For example, when IP address of “172.31.16.5” is entered, only the PC of which IP address is “172.31.16.5” in the LAN can send a mail.

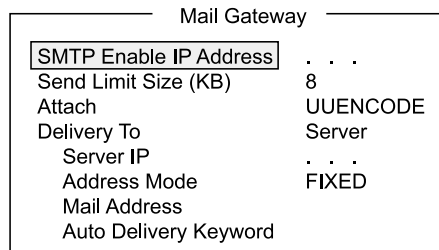


Procedure

1. Press [F8][2] to open “System Setup” menu.
2. Select “Network Setup”, followed by [Enter].
3. Select “Mail Gateway”, followed by [Enter].



4. Select “SMTP Enable IP Address”, followed by [Enter].



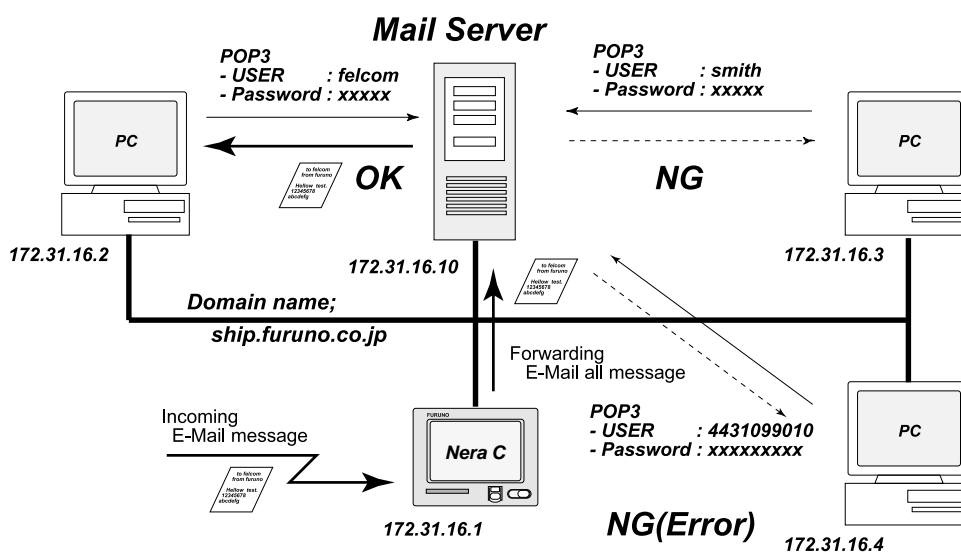
5. Set “IP address” for mail service, followed by [Enter].
6. Press [Esc] to show [Update].
7. Select “Yes”, followed by [Enter] to update the setting.
8. Press [Esc].

AP4.9.3 Mail Gateway

When a mail server is connected to the LAN, the received mail can be transferred to the mail server. To do so, follow steps below.

The figure below shows a LAN to which a mail server is connected.

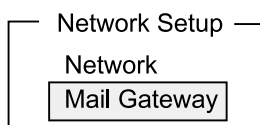
- Mail server IP address : 172.31.16.10
- LAN domain name : ship.nera.co.jp
- Transferred mail address : nera_c@ship.nera.no (IP Address: 172.31.16.2)



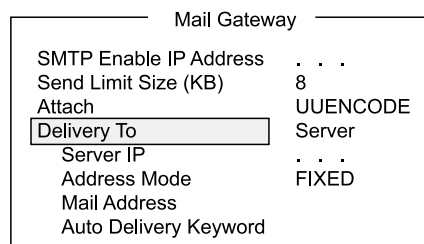
Procedure

When a mail server is not connected to the LAN, below setting is unnecessary.

1. Press [F8][2] to show "System Setup" menu.
2. Select "Network Setup", followed by [Enter].
3. Select "Mail Gateway", followed by [Enter].



4. Select "Delivery To", followed by [Enter].



5. Select "Server", followed by [Enter].

Note) Meaning of "PC Mailer";

Received messages are sent to the PC in the LAN.

6. Select "Server IP", followed by [Enter].
7. Enter IP address of the mail server, followed by [Enter].
8. Select "Address Mode", followed by Enter].
9. Select "FIXED".

Note) Meaning of "Auto";

The received message is forwarded to the address which appears just after the keyword in the message. When the keyword is not found, the message is sent to the address set in "Mail Address".

10. Select "Mail Address", followed by [Enter].
11. Enter the mail address received at the mail server, followed by [Enter].
12. Press [Esc] to show [Update].
13. Select "Yes", followed by [Enter]. The message "Press ESC key to Restart Nera C." appears.
14. Press [Esc]. The system restarts automatically and new settings are loaded.
When "Delivery To" setting is changed only to "Server" from "Pc mailer", the system restart automatically and settings are loaded.

AP4.9.4 Selective forwarding

This function is used by the sender when sending the message. Make sure that all senders know how to write the keyword and the mail address.

The message can be forwarded to the address which appears just after a keyword.

For example, if the keyword is `/+forward+/` and the address is

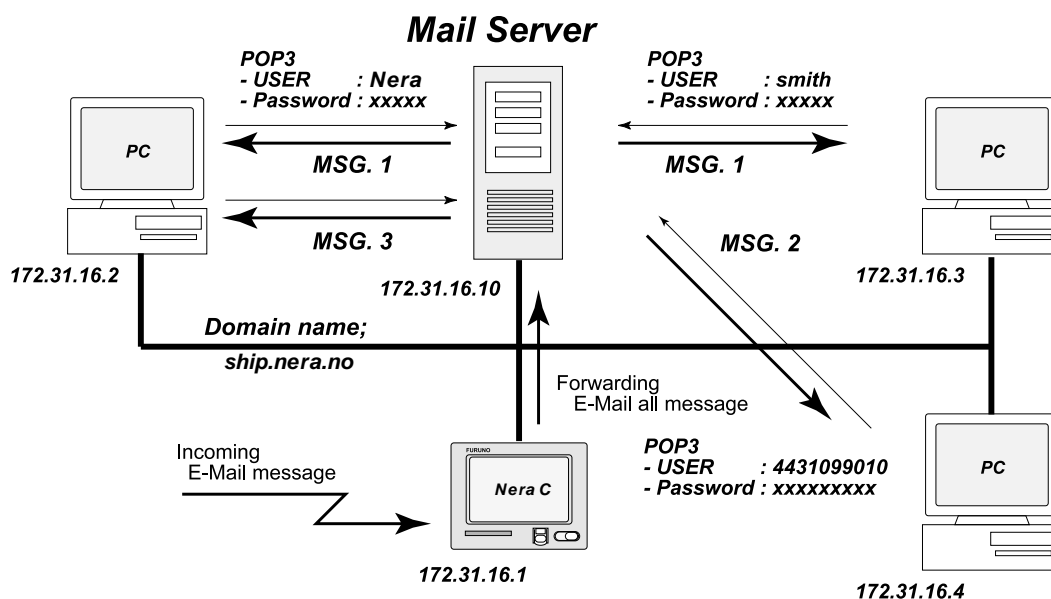
`nera_c@ship.nera.co.jp`,

`/+forward+/nera_c@ship.nera.no` is typed on the top of the message.

Note)

- 1) Do not enter a space between the keyword and the mail address.
- 2) Up to 10 mail address can be entered.

- Mail server IP address : 172.31.16.10
- LAN domain name : ship.nera.no
- Mail address to forward to : nera_c@ship.nera.no (IP Address: 172.31.16.2)
- Keyword : `/+forward+/`



MSG. 1

To: ****@***.***
 Subject:
 Test mail
`/+forward+/nera_c@ship.nera.no`
`/+forward+/smith@ship.nera.no`
 This is test message.....

MSG. 2

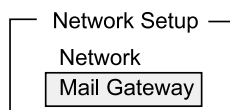
To: ****@***.***
 Subject:
 Test mail
`/+forward+/4431099010@ship.nera.no`
 This is test message.....

MSG. 3

To: ****@***.***
 Subject:
 Test mail
 This is test message.....

Procedure

1. Press [F8][2] to open “System Setup” menu.
2. Select [Network Setup], followed by [Enter].
3. Select “Mail Gateway”, followed by [Enter].



4. Select “Delivery To”, followed by [Enter].
5. Select “Server”, followed by [Enter].
6. Select “Server IP”, followed by [Enter].
7. Enter the mail “server IP address”, followed by [Enter].
8. Select “Address Mode”, followed by [Enter].
9. Select “Auto”.

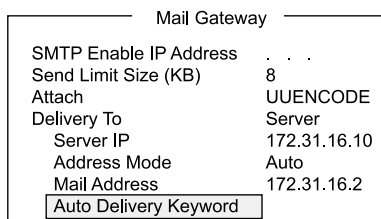
Note) Meaning of “Fixed”;

The received message is sent to the address designated by “Mail Address”.

10. Select “Mail Address”, followed by [Enter].
11. Enter the “Mail address”, followed by [Enter].

When the keyword is not found, the message is sent to the address set in “Mail Address”.

12. Select “Auto Delivery Keyword”, followed by [Enter].



13. Enter the keyword, followed by [Enter]. The keyword is up to 15 characters.

Note) Use characters which appear rarely in the text field. Make sure that all senders know how to write the keyword and the mail address.

14. Press [Esc] to show [Update].
15. Select “Yes”, followed by [Enter]. The message “Press ESC key to Restart Nera C.” appears.
16. Press [Esc]. The system restarts automatically and new settings are loaded.

When “Deliver To” is changed from “PC mailer” to “Server”, the system restarts and settings are loaded.

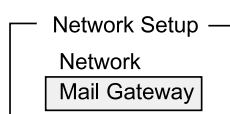
AP4.9.5 Message size

The Nera C administrator may limit the size of outgoing messages. When the message size is larger than the preset value, the message is not sent out with “Data size too large” indication.

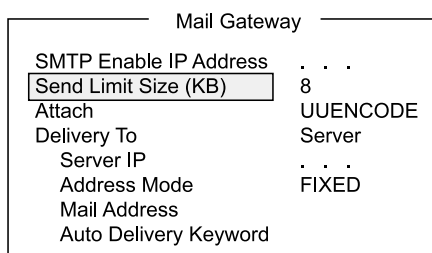
Note that an attachment is encoded and its size increases about 1.5 times.

Procedure

1. Press [F8][2] to open “System Setup” menu.
2. Select [Network Setup], followed by [Enter].
3. Select “Mail Gateway”, followed by [Enter].



4. Select “Send Limit Size (KB)”, followed by [Enter].



5. Choose the maximum message size among 2, 4, 6, 8, 10 and 32.
6. Press [Esc] to show [Update].
7. Select “Yes”, followed by [Enter].
8. Press [Esc].

AP4.9.6 Attachment conversion

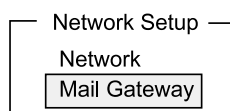
When a sending e-mail attachment from a PC in the network is MIME encoded, the system converts it into UNENCODE (Default) or BINARY attachment according to menu setting.

Note 1) BINARY is selected when the e-mail of the land subscriber does not support UNENCODE attachment.

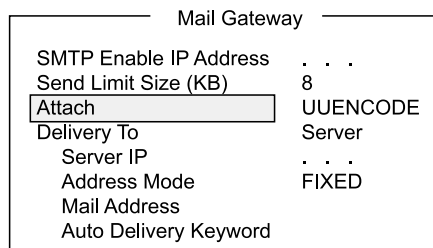
Note 2) Note that some LES do not handle BINARY attachments. Contact your LES for details.

Procedure

1. Press [F8][2] to open “System Setup” menu.
2. Select [Network Setup], followed by [Enter].
3. Select “Mail Gateway”, followed by [Enter].



4. Select “Attach”, followed by [Enter].



5. Choose “UUENCODE” or “BINARY”, followed by [Enter].
6. Press [Esc] to open [Update].
7. Select “Yes”, followed by [Enter].
8. Press [Esc].

AP4.10 E-mail Client Setup (Outlook Express Ver.6)

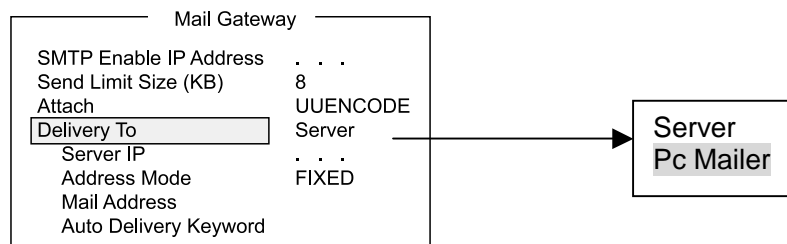
Contact with the network administrator who knows the network and/or applications on board ship.

The mail software on a PC is set for LAN e-mail, referring to the instruction for the software.

Table below lists the necessary settings on the PC when Nera C is set to “PC Mailer” in “Mail Gateway” menu.

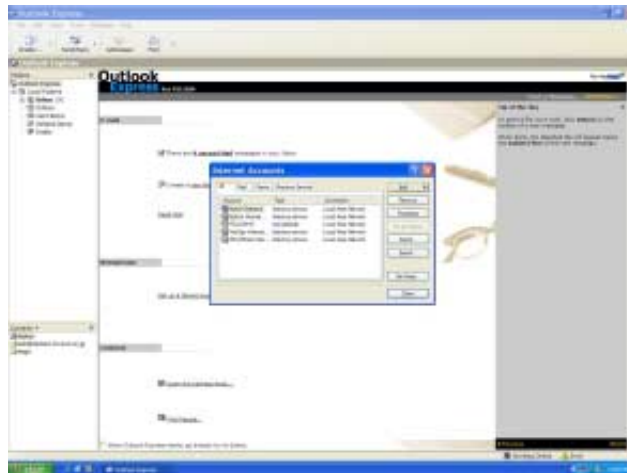
PC setting when setting to Pc Mailer

Item	Setting	Remarks
POP3 server	IP address of Nera	
POP3 port number	110	Cannot be changed.
SMTP server	IP address of Nera	
SMTP port number	25	Cannot be changed.
User account	IMN number	Cannot be changed.
POP3 password	IMN number	Cannot be changed.
Mail address	Provider mail address	Received sender's address is the address of e-mail station.
Signature	Any	Setting is not received.

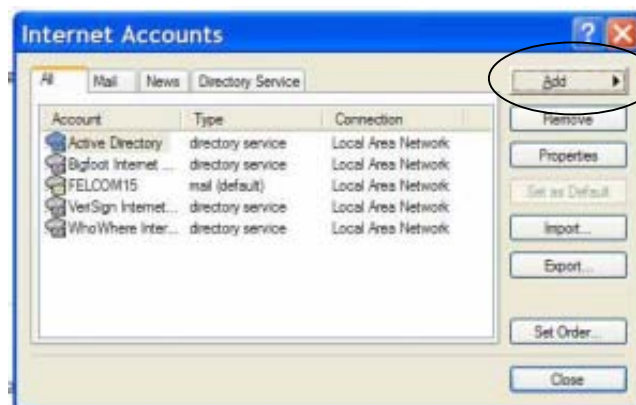


Following explains how to set Outlook Express mail software.

1. Run “Outlook Express”.
2. Select “Account” from “Tool”. “Internet Account” appears.



3. Click “Add” and select “Mail”. “Your Name” appears.



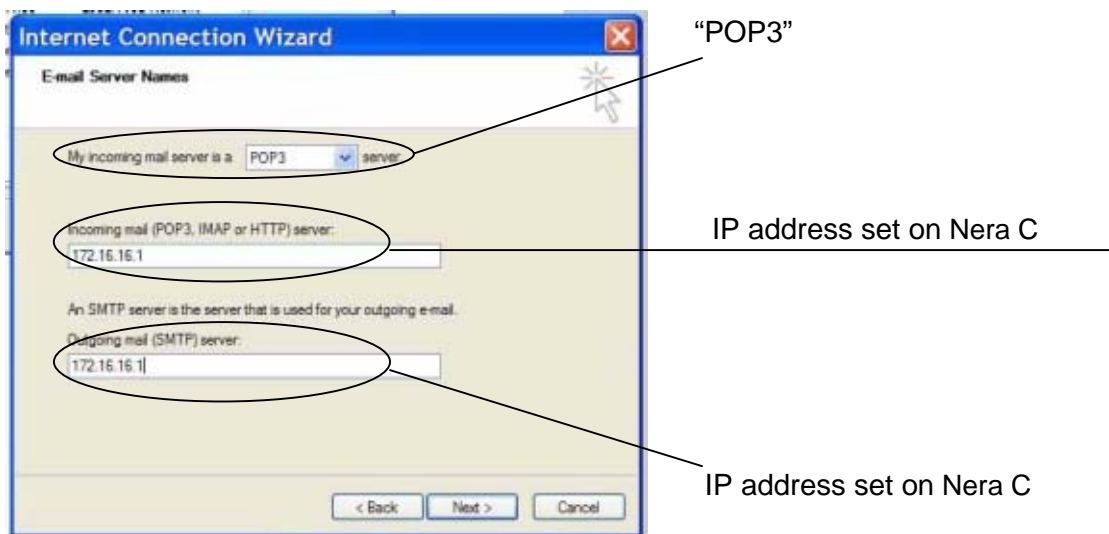
Click “Add” and select “Mail”.

4. Enter desired name into “Display Name” in “Your Name” and then click “NEXT”. “Internet E-Mail Address” appears.
5. Enter desired “mail address” into “E-Mail Address” in “Internet E-mail Address” and then click “NEXT”. The entered address is not used for the communication. “E-Mail Server Name” appears.

6. Set following items in “E-Mail Server Name”.

- My incoming mail server is a ☐ server : POP3.
- Incoming mail (POP3, IMAP or HTTP) server : IP address set on Nera C.
- Outgoing mail (SMTP) server : IP address set on Nera C.

The default IP address of Nera C is “172.32.16.1”. After entering IP address, click “NEXT”. “Internet Mail Login” appears.



7. Set following items in “Internet Mail Login”.

- Account name : Enter “IMN” registered on Nera C.
- Password : Enter “IMN” registered on Nera C.



8. Click “NEXT” after setting. “Congratulations” appears.

9. Click “Finish” in “Congratulations”. “Internet Accounts” appears.

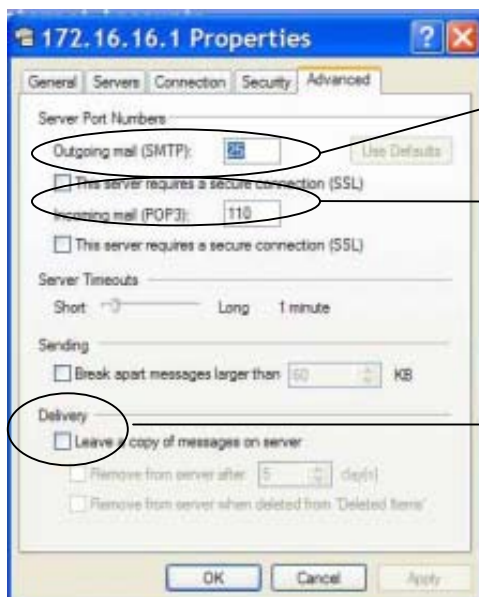


10. Select “Account” name registered at step 7 in “ Internet Accounts” and click “Properties”. “xxxx Properties” appears.



11. Select “Advanced” and set “Server Port Number” as follows. Then, click “OK”.

- Outgoing mail (SMTP) : 25
- Incoming mail (POP3) : 110



Set to 25.

Set to 110.

When the mail server is not connected to the LAN;

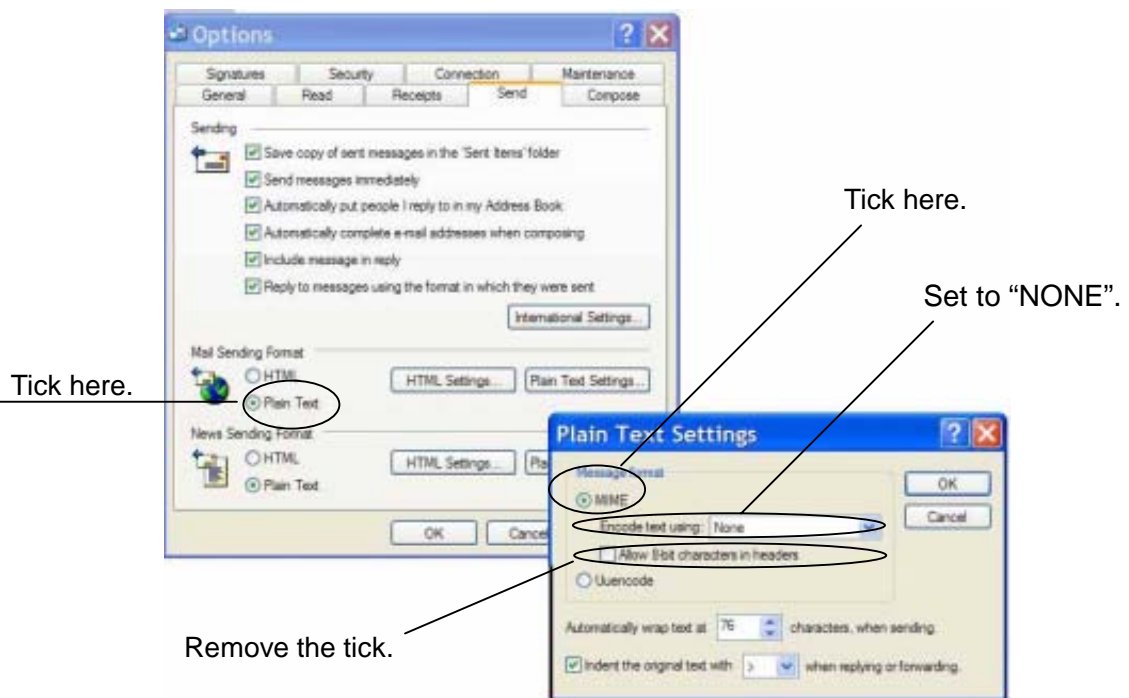
Tick here when the message is received by more than one PC. The message is received by other PC in the LAN.

12. Select “Option” from “Tool” in “Out Look Express”. “Options” appears.

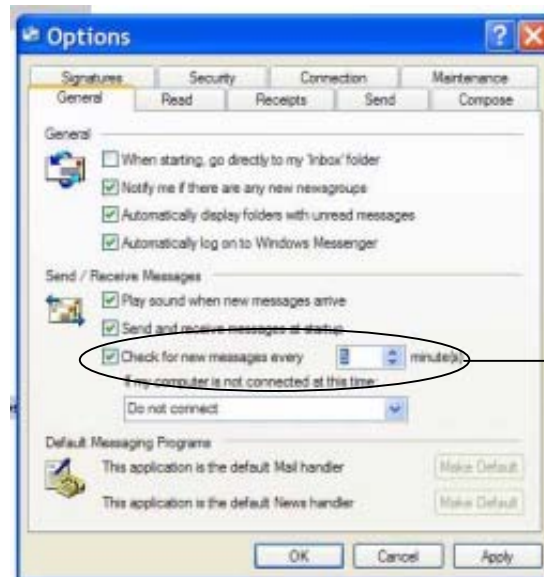


13. Click “Send” tab, tick “Plain Text” in “Mail Sending Format”, and select “Plain Text setting” to set followings items. Then, click “OK”.

- MIME : Tick here.
- Encode text using : None
- Allow 8-bit characters in headers : Remove the tick.



14. Click “General” tab. Check “Check for new message every minute (S)” and then set it to “5 minutes”.



Set to 5 minutes.

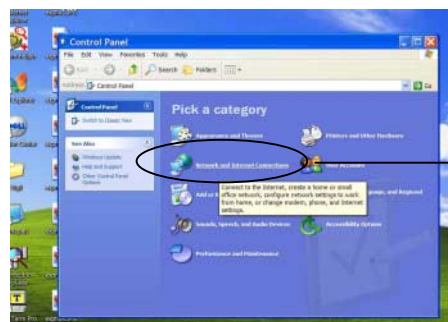
15. Click “OK”.

AP4.11 Windows XP LAN setting

Contact with the network administrator who knows the network and/or applications on board ship.

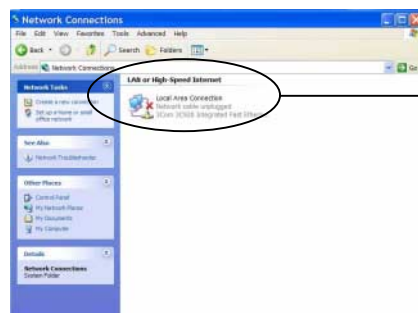
For example; To setup the PC for network connection (single PC and multiple PCs) see page AP4-9 to AP-11

1. Open “Control Panel”.



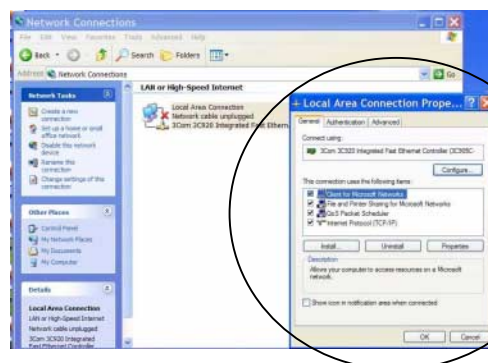
Network and Internet Connections

2. Select “Network and Internet Connections”. “Network Connections” appears.



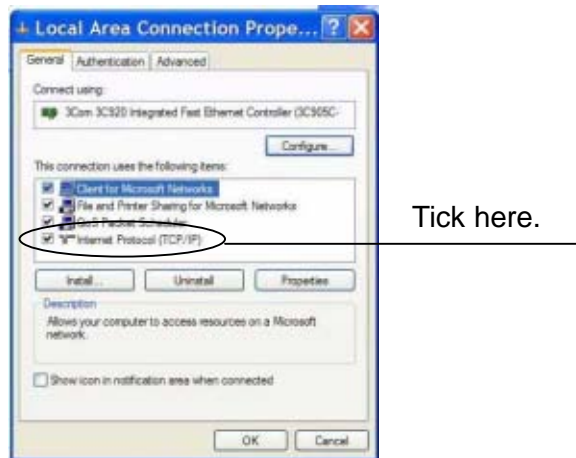
“Local Area Connection” icon

3. Select “Local Area Connection” icon and right-click. Then, click “Properties”. “Local Area Connection Properties” appears.

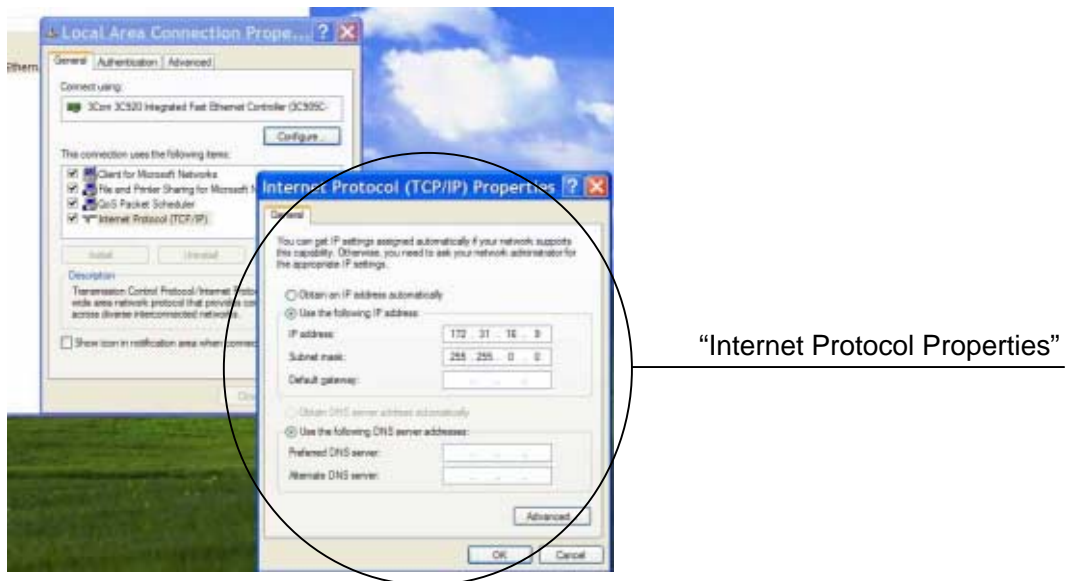


“Local Area Connection Properties”

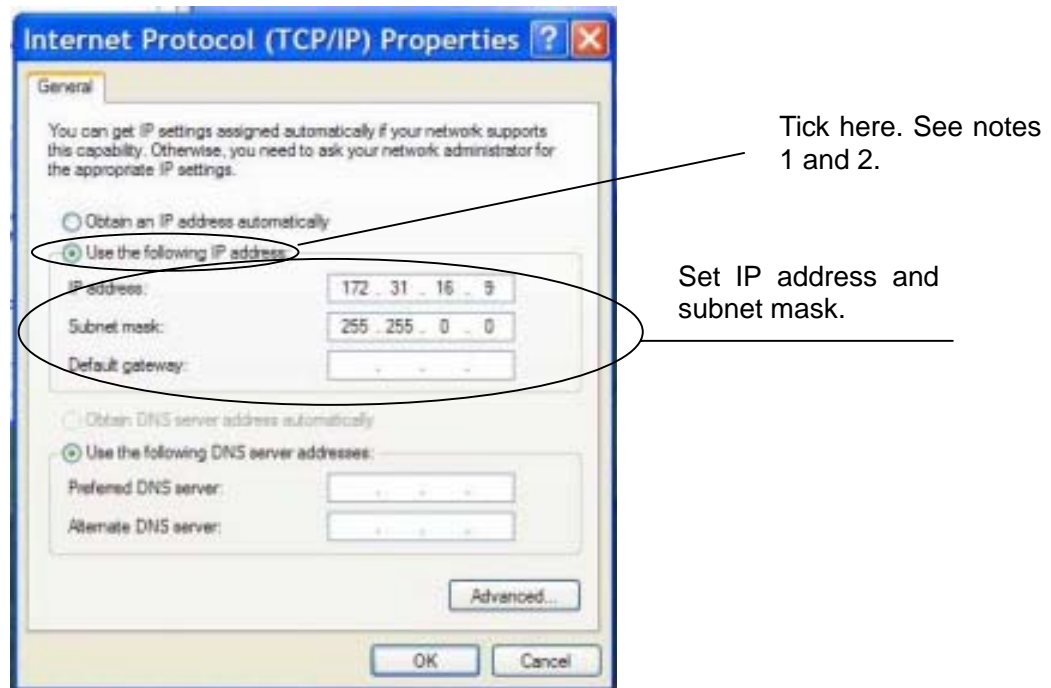
4. Click “General” tab and check the tick to Internet Protocol (TCP/IP).



5. Click “Properties”. “Internet Protocol Properties” appears.



6. Tick “Use the following IP address” and set IP address and subnet mask.



7. Click “OK” to register the setting value.

Note 1

Set IP address and subnet mask as follows when the default IP address (172.32.16.1) and subnet mask (255.255.0.0) are used.

- IP address: 172.32.16.x
Enter a number other than 1 to “x”. 1 is for Nera C.
- Subnet mask: 255.255.0.0

Note 2

To allocate IP address from the server automatically, tick “Obtain an IP address automatically” and set “DHCP” in “Network” menu on Nera C to ON.

Note 3

When connecting to other network by using the router, set IP address of “Gateway”.

AP4.12 Connection check

AP4.12.1 Checking by Ping command

Ping command is used for checking the connection between Nera C and the PC. Type “ping” and IP address of Nera C in “Command prompt” on the PC. For example, when IP address is “172.31.16.1”, type “ping 172.31.16.1”. When Nera C is connected to the PC correctly, the replay message (Reply from -) appears as below. When the message “Request time out.” appears, check the network connection and IP address of Nera C.

This command is only available on the PC.

Example of reply message:

Reply from 172.31.16.1: bytes=32 time=10ms TTL=32

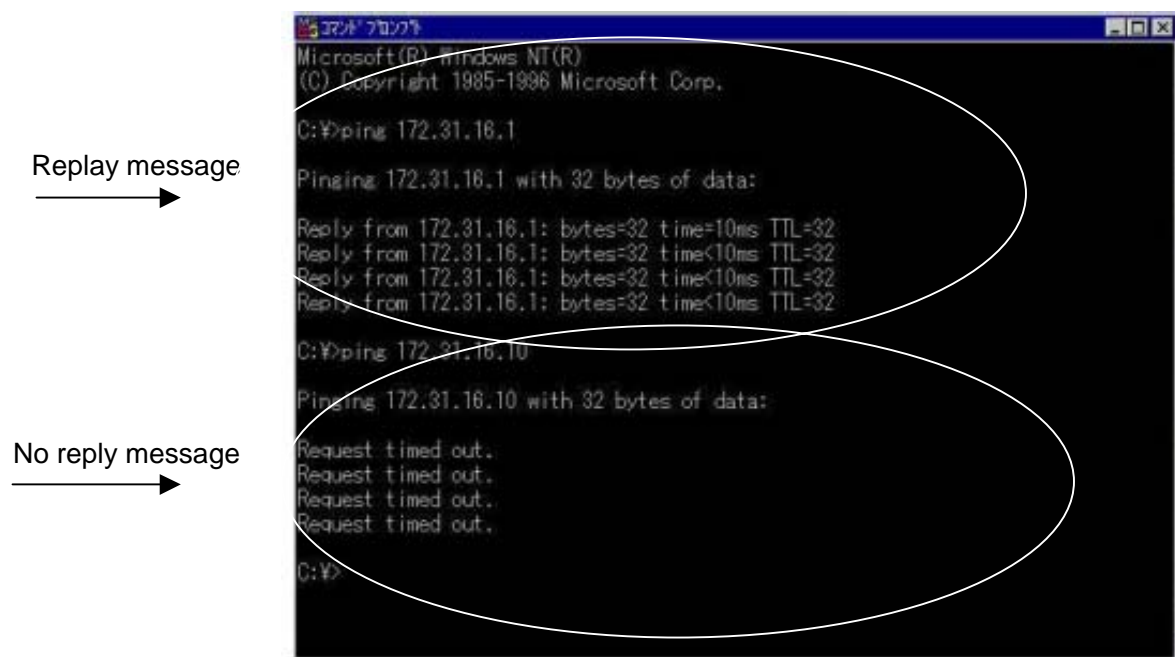
Reply from 172.31.16.1: bytes=32 time<10ms TTL=32

No reply message:

Request time out.

Set “Device” to 10 Mbps and Half Duplex when the LAN card is 100 Mbps.

The Nera C LAN port specification is 10 Mbps and Half duplex.



Other commands

- ipconfig /all: Displays all commands about TCP/IP
- netstat -a : Displays all active TCP connections and the TCP and UDP ports on which the computer is listening.

AP4.12.2 SMTP error message list

When Nera C fails to communicate with mail software on the PC, following SMTP error messages appear.

552: sorry, system busy now.

The TX message queue is full.

451: current LES out of service area.

Selected service provider is not within current ocean area.

503: no target address.

Delivery address has not been set.

503: Too many address.

The number of delivery addressed is more than the system can handle.

503: Send message type mismatch.

Address parameter error

503: Send message parameter mismatch.

Address parameter error

501: Illegal address.

Invalid character used in delivery address, or invalid domain name (no period entered)

501: Mail data abnormal.

Abnormal mail header

552: Data size too large.

Message size is larger than "Send Size Limit" value in the "Mail Gateway" menu.

450: Your address access denied.

The SMTP Enable IP Address on

AP4.13 US ASCII code list

	$b_7b_6b_5$	0_00	0_01	0_10	0_11	1_00	1_01	1_10	1_11
$b_4 \sim b_1$		0	1	2	3	4	5	6	7
0 0 0 0	0	NUL	TC7(DLE)	SP	0	@	P	`	p
0 0 0 1	1	TC1(SOH)	DC1	!	1	A	Q	a	q
0 0 1 0	2	TC2(STX)	DC2	”	2	B	R	b	r
0 0 1 1	3	TC3(ETX)	DC3	#	3	C	S	c	s
0 1 0 0	4	TC4(EOT)	DC4	\$	4	D	T	d	t
0 1 0 1	5	TC5(ENQ)	TC8(NAK)	%	5	E	U	e	u
0 1 1 0	6	TC6(ACK)	TC9(SYN)	&	6	F	V	f	v
0 1 1 1	7	BEL	TC10(ETB)	,	7	G	W	g	w
1 0 0 0	8	FE0(BS)	CAN	(	8	H	X	h	x
1 0 0 1	9	FE1(HT)	EM	)	9	I	Y	i	y
1 0 1 0	10	FE2(LF)	SUB	*	:	J	Z	j	z
1 0 1 1	11	FE3(VT)	ESC	+	;	K	[	k	{
1 1 0 0	12	FE4(FF)	IS4(FS)	,	<	L	\	l	|
1 1 0 1	13	FE5(CR)	IS3(GS)	-	=	M	]	m	}
1 1 1 0	14	SO	IS2(RS)	.	>	N	^	n	
1 1 1 1	15	SI	IS1(US)	/	?	O	_	o	DEL

Appendix 5) Specifications

1. GENERAL

- | | | |
|------|---------------------------|--|
| 1.1 | Transmitting Frequency | 1626.5 to 1646.5 MHz |
| 1.2 | Receiving Frequency | 1530.0 to 1545.0 MHz |
| 1.3 | Channel Interval | 5 kHz |
| 1.4 | G/T | Better than -23 dB/K (elevation angle 5°) |
| 1.5 | EIRP | 12 to 16 dBW (elevation angle 5°) |
| 1.6 | Modulation | BPSK |
| 1.7 | Modulation Rate | 1200 sps |
| 1.8 | Coding | Convolution with coding rate 1/2 and constraint length 7 |
| 1.9 | Decoding | Viterbi decoder |
| 1.10 | Navigation Data Interface | IEC61162-1, Internal GPS Board (option) |
| | INPUT DATA SENTENCES | BWC, BWR, GGA, GLL, VTG, WPL, RMA, RMB, RMC, MTW,DBT, VDR, ZDA |
| | OUTPUT DATA SENTENCES | GGA, ZDA, GLL, VTG, RMC, GSV |

2. ANTENNA UNIT

- | | | |
|-----|--------------------|--|
| 2.1 | Antenna Type | Daisy Loop Antenna |
| 2.2 | Gain | |
| | Horizontal | : Omnidirectional |
| | Vertical | : Angle of elevation: 90° at 0 dBi or more |
| | Angle of elevation | : 5° at +1.3 dBi or more |
| 2.3 | Declination | Clockwise circular |
| 2.4 | Axial Ratio | Within 6 dB (5° to 90°) |
| 2.5 | VSWR | 1.5 or less/ 50 ohm |

3. POWER SOURCE

- | | | |
|-----|---------------|---|
| 3.1 | Terminal Unit | 12-24 VDC: 13.0-5.0 A (Transmit), 1.7-0.9 A (Receive) |
|-----|---------------|---|

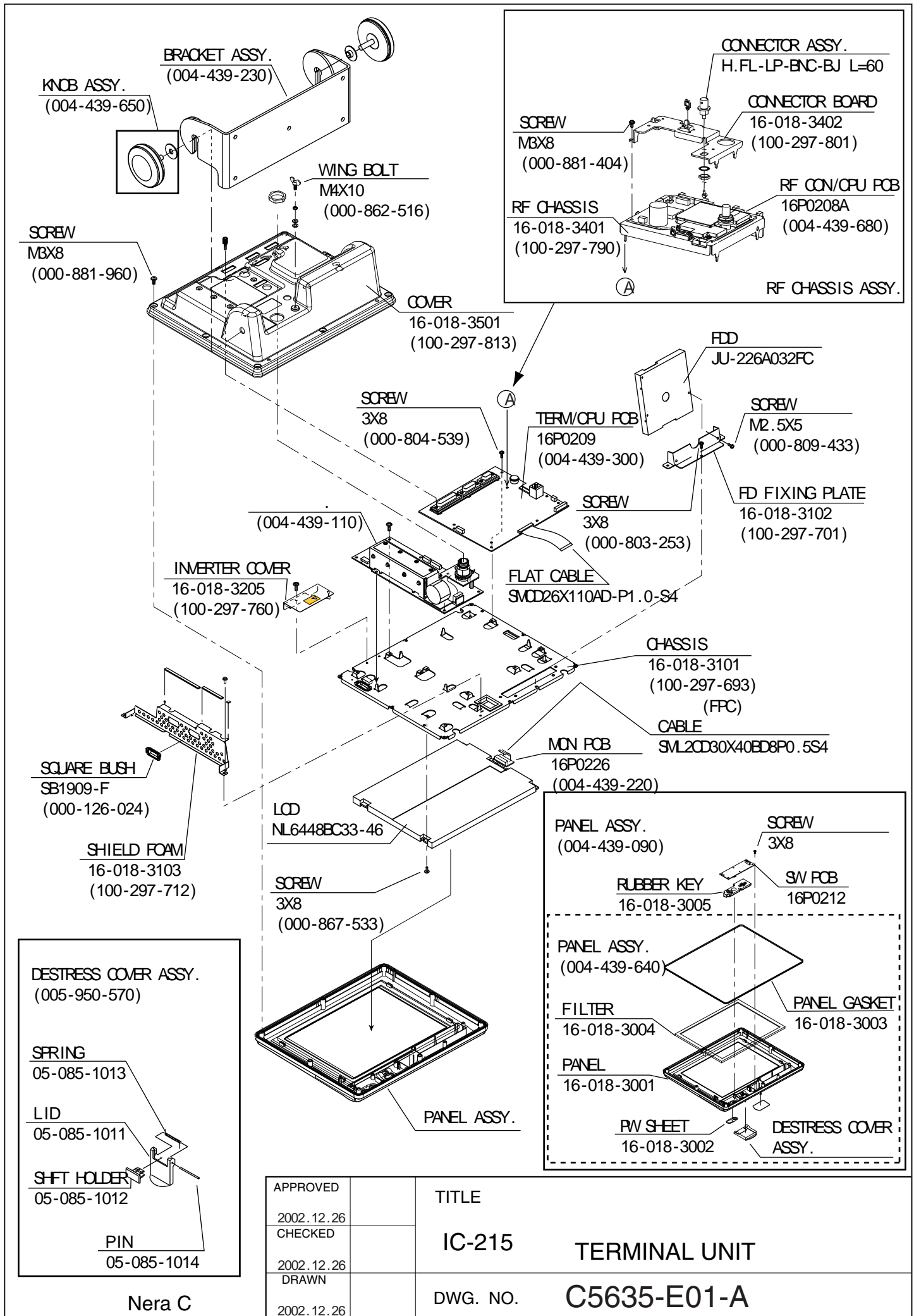
4. ENVIRONMENTAL CONDITION

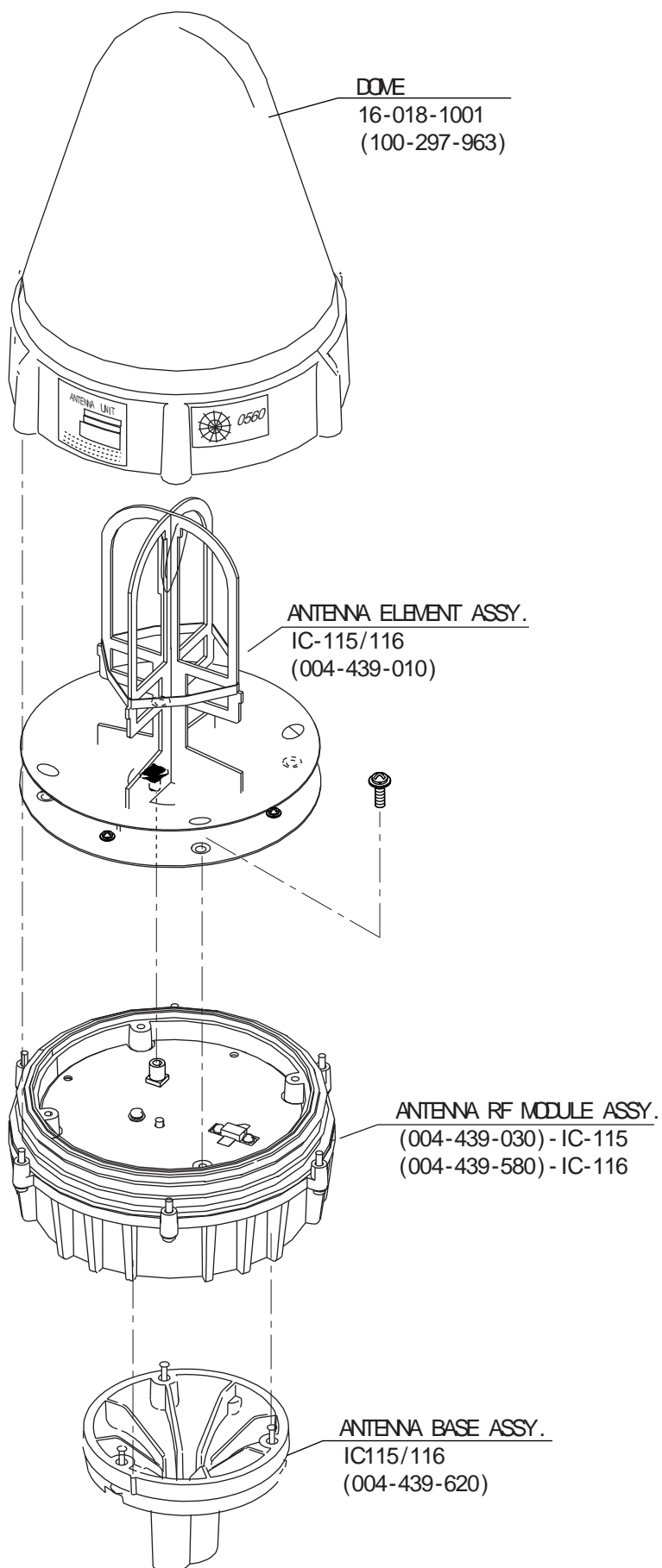
- | | | |
|-----|-----------------------|----------------|
| 4.1 | Ambient Temperature | |
| | Above deck equipment: | -35°C to +55°C |
| | Below deck equipment: | -15°C to +55°C |

4.2	Relative Humidity	95% (at +40°C)
4.3	Waterproof (IEC 60529)	
	Antenna Unit	IPX6
	Others	IPX0
4.4	VIBRATION	IEC 60945

5. COATING COLOR

5.1	Antenna Unit	Upper: N9.5, Lower: 2.5PB3.5/10
5.2	Terminal Unit	N3.0
5.3	Others	2.5GY5/1.5





Nera C
Nera Mini-C

APPROVED	
2002.12.26	
CHECKED	
2002.12.26	
DRAWN	
2002.12.26	

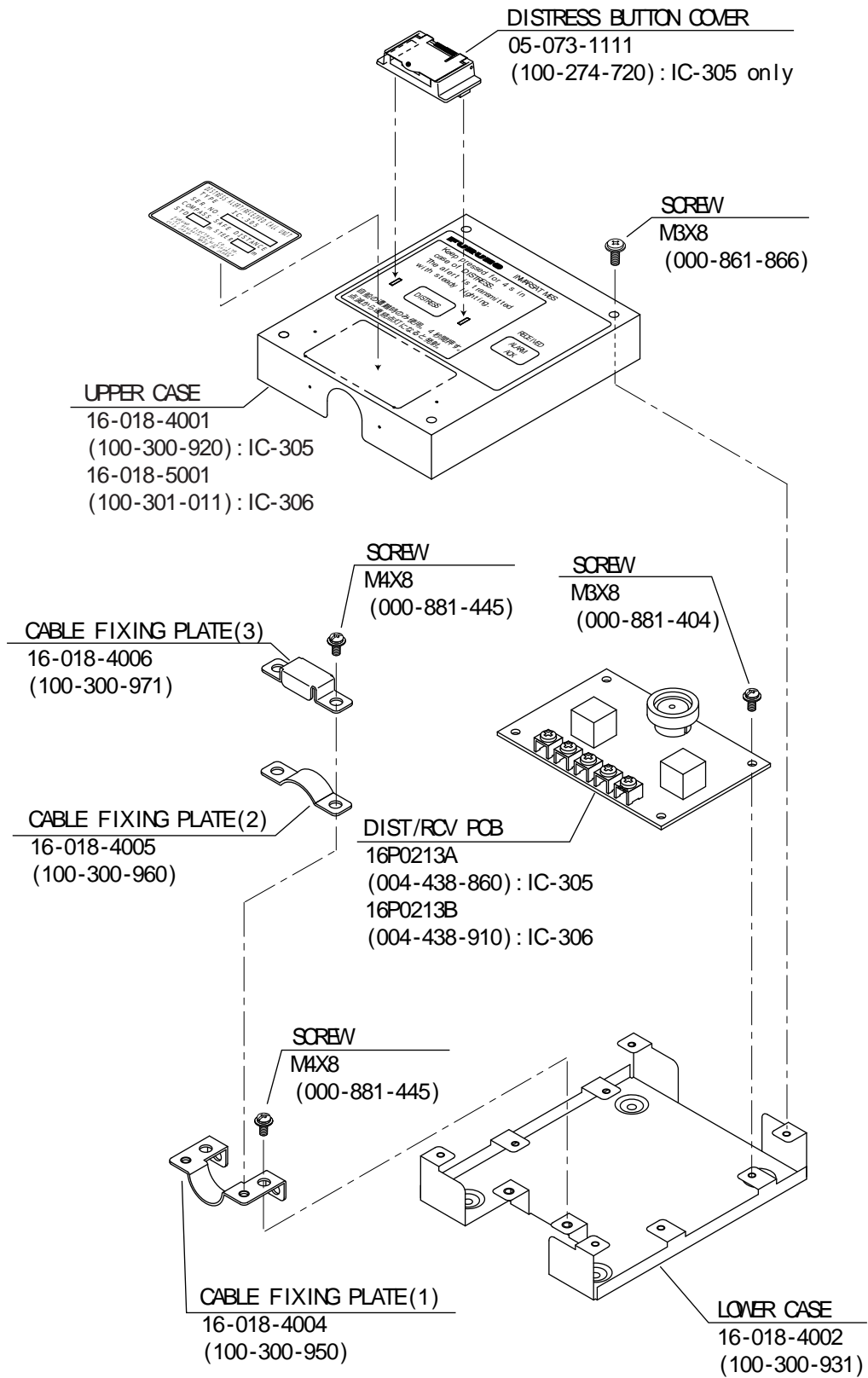
TITLE

IC-115
IC-116

ANTENNA UNIT

DWG. NO.

C5638-E02-A



APPROVED		TITLE	DISTRESS ALERT/RECEIVED CALL UNIT
2002.12.26		IC-305	
CHECKED		IC-306	ALARM UNIT
2002.12.26			
DRAWN		DWG. NO.	C5635-E03-A
2002.12.26			

Nera C

Nera SatCom

ELECTRICAL PARTS LIST

2002 12

Model	IC-215		
Unit	TERMINAL UNIT		
Ref.Dwg.	C5635-K01-A	Page	
Blk.No.		E-1	

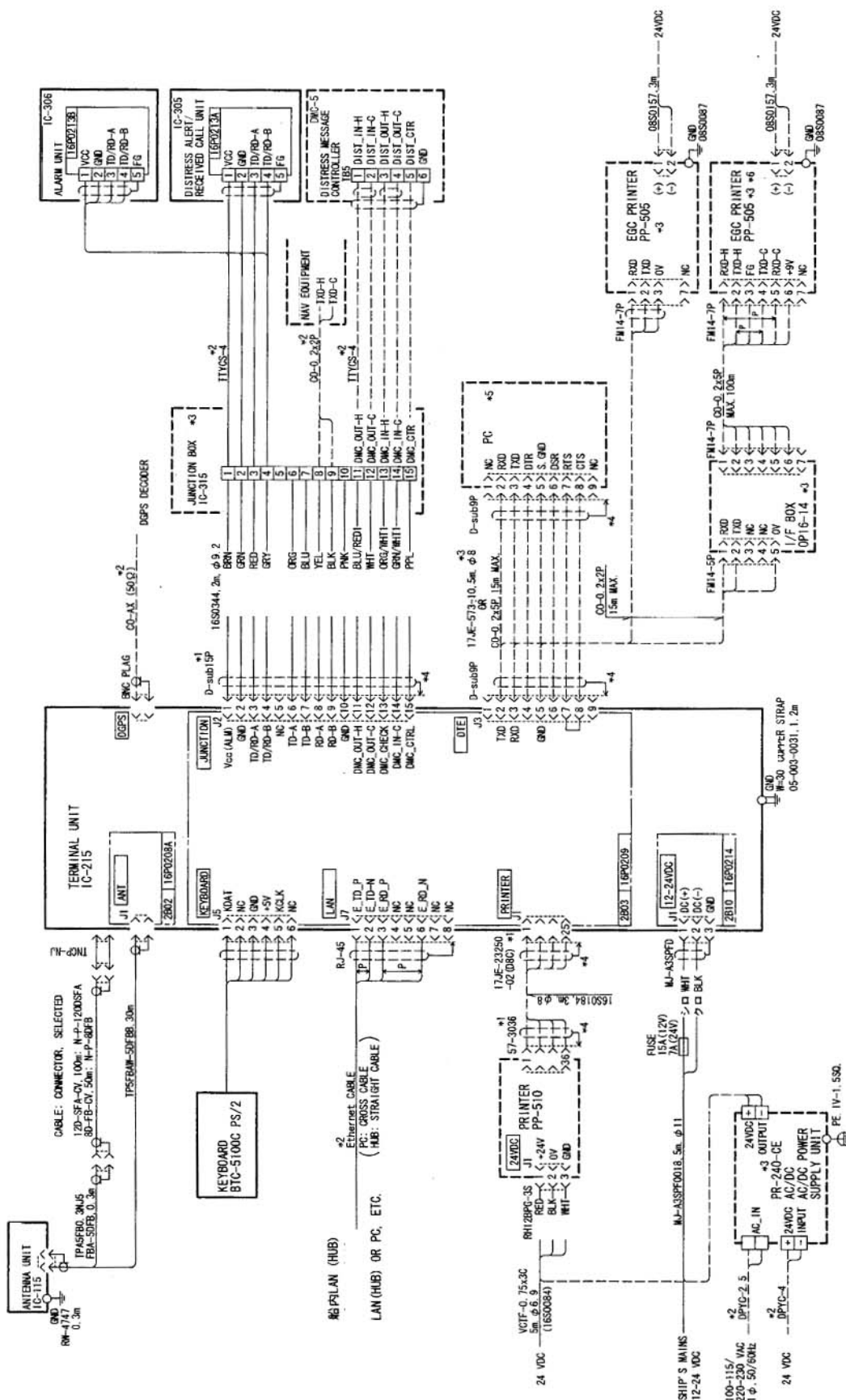
SYMBOL	TYPE	CODE No.	REMARKS	SHIPPABLE ASSEMBLY
PRINTED CIRCUIT BOARD				
2B2	16P0208A, RF CON/CPU	004-439-680		✓
2B3	16P0209, TERM/CPU	004-439-300		✓
2B5	16P0212, SW	004-439-100		✓
2B6	16P0226, MCN	004-439-220		✓
2B10	16P0214, PWR-C	004-439-170		✓
2B11	16P0223, PWR HIC	004-439-150		✓
2B12	16P0221, PWR HIC	004-439-130		✓
2B13	16P0224, PWR HIC	004-439-160		✓
2B15	16P0220, PWR-HIC	004-439-140		✓
PANEL ASSEMBLY				
	IC-215	004-439-090	with 16P0212	✓
	IC-215	004-439-640	without 16P0212	✓
POWER ASSEMBLY				
2B4/10	IC-215	004-439-110	16P0211, PWR/16P0214, PWR-C	✓
MINI KEYBOARD				
	BTC-5100C PS/2	004-442-400		✓
LCD		LCD		
2B7	NL6448BC33-46	000-144-814		
FDD		FDD		
2B8	JU-226A032FC	000-146-045		
GPS RECEIVER				
2B9	GN-79	000-146-179	GN-79L5A-N, Option	
CABLE w/CONNECTOR				
W1	16-167 (8-5, 3P)	004-439-340	PH Connector	
W3	16-166 (4-4P)	004-439-330	PH Connector	
W4	16-165 (9-9P)	004-439-320	PH Connector	
W5	16-164 (7-7P)	004-439-310	PH Connector	
W6	16-169 (3-3P)	004-439-360	PH Connector	
W8	51065-0700-PHR7-L040	000-146-174		
W9	H.FL-2LP-FHSB-A (100)	000-146-259		
W10	16-168 (11-11P)	004-439-350	PH Connector	
W11	H.FL-LP-BNC-BJ L=60	000-146-253		
W12	SML2CD30X40BD8P0.5S4	000-146-187	FPC CABLE	
W13	SMCD26X110AD-P1.0-S4	000-146-260	16S0377-0	

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✓

Contents of Drawings

Name	Type	Dwg. No.	Page	Remark
Nera C Interconnection diagram	Nera C	C5635-C01	S-1	
Antenna unit	IC-115	C5635-K04	S-2	
ANT RF	16P0207	C5635-K05	S-3	
Terminal unit	IC-215	C5635-K01	S-4	
TERM CPU	16P0209(1/3)	C5635-K07	S-5	
	16P0209(2/3)	C5635-K08	S-6	
	16P0209(3/3)	C5635-K09	S-7	
RF CON/CPU	16P0208A(1/3)	C5635-K10	S-8	
	16P0208A(2/3)	C5635-K11	S-9	
	16P0208A(3/3)	C5635-K12	S-10	
PWR	16P0211(1/2)	C5635-K02	S-11	
	16P0211(2/2)	C5635-K03	S-12	
SW	16P0212	C5635-K13	S-13	
DIS/RCV I	16P0213A/B	C5635-K06	S-14	A: Distress Alarm B: Incoming IND
PWR HIC	16P0220	C5635-K14	S-15	Used for PWR p.c.b
	16P0221	C5635-K15	S-16	
	16P0222	C5635-K16	S-17	
	16P0223	C5635-K17	S-18	
	16P0224	C5635-K18	S-19	
	16P0225	C5635-K19	S-20	
AC/DC power supply	PR-240	C5003-K02	S-21	PR-240
PLE p.c.b (PR-240)	PLE24HSZ-P	C5003-K03	S-22	



NOTE

- *1. FITTED AT FACTORY.
- *2. SHIPYARD SUPPLY.
- *3. OPTION.
- *4. GROUND THRU CONNECTOR CLAMP.
- *5. USER SUPPLY.
- *6. TB BOARD (16P0116) REQUIRED.

TITLE **Nera C**

DESIGN	4.03	I. YAMASAKI
CHECKED	4.03	I. MATSUGUCHI
APPROVED	4.03	I. Matsuguchi
SCALE	MASS	HE
DWG No.	C5635-C01-D	

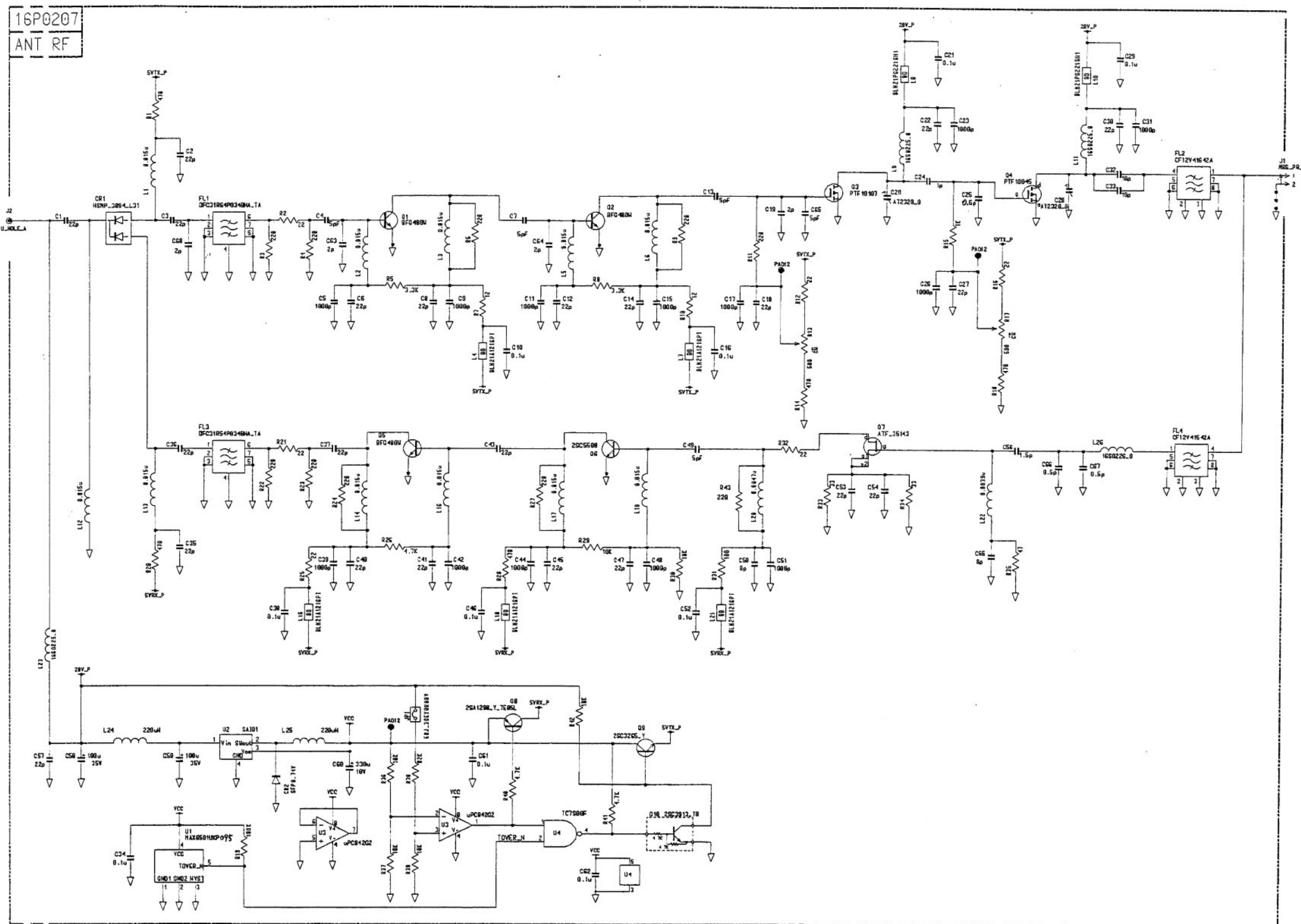
CO-0 2X2P: CO-SPEW-SB-C 0.2X5P, φ10.5
CO-0 2X5P: CO-SPEW-SB-C 0.2X5P, φ13.5

INTERCONNECTION DIAGRAM

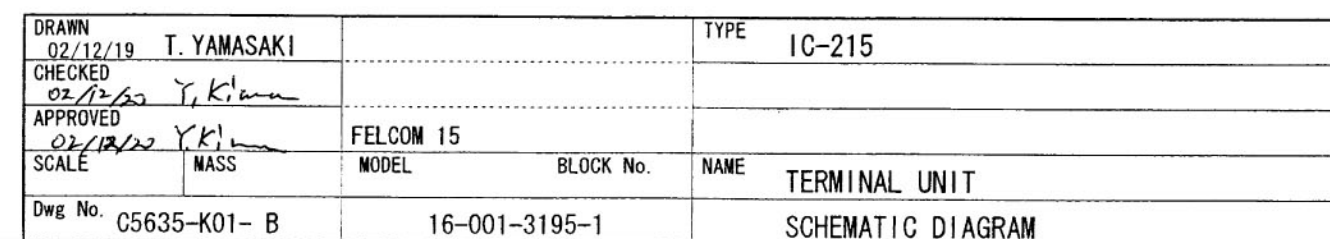


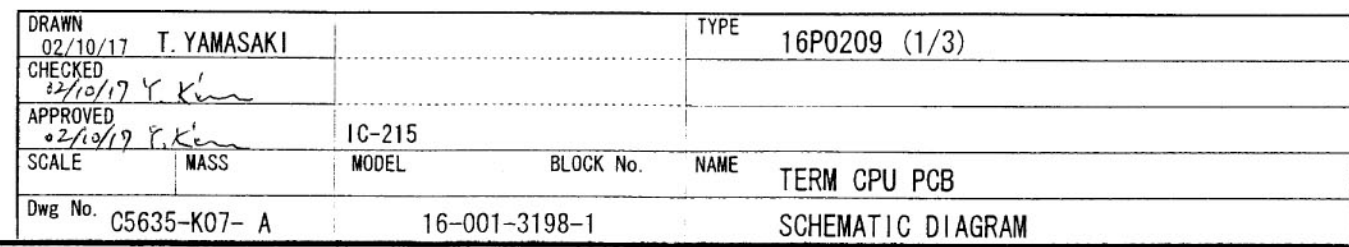
C

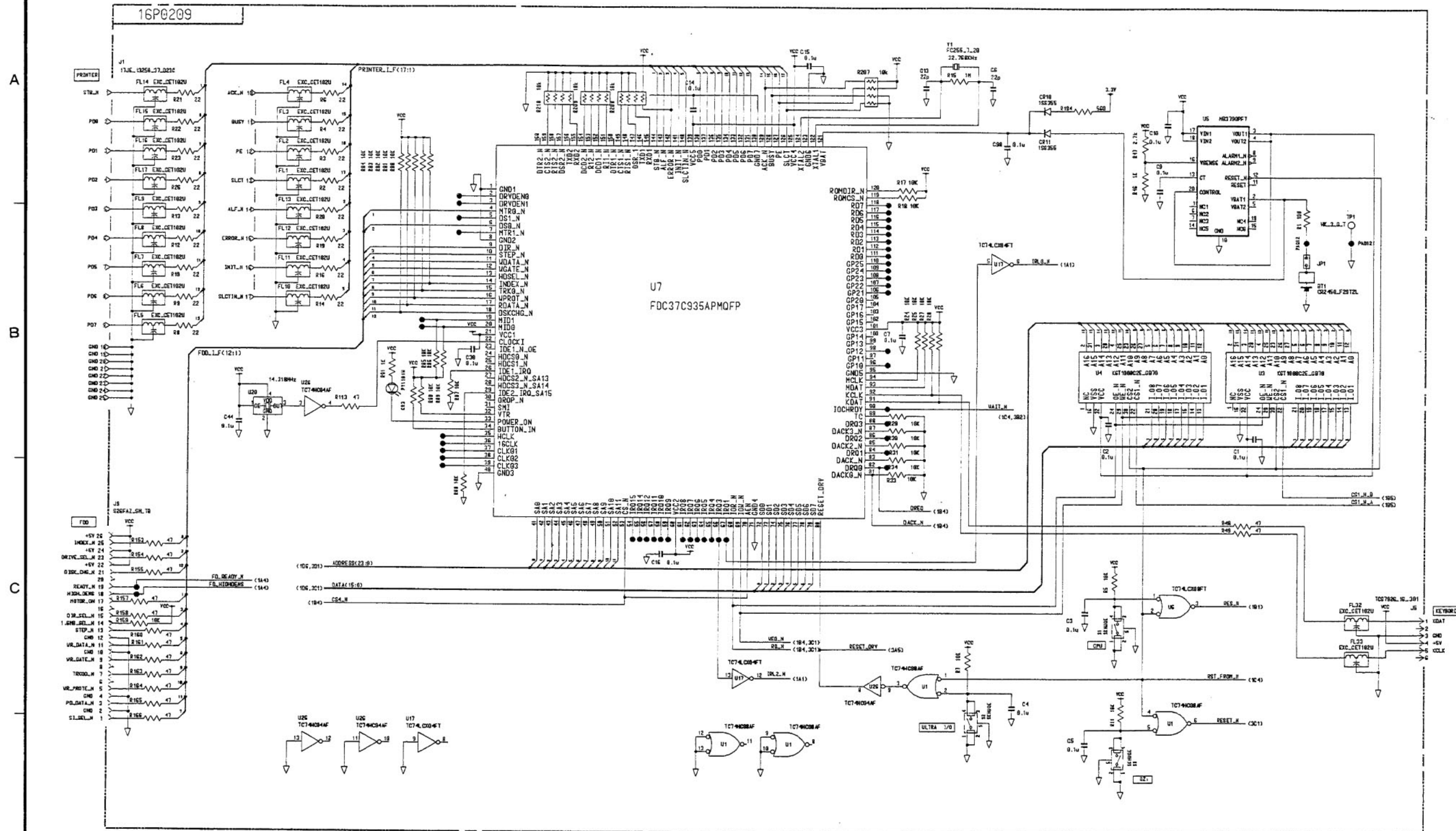
DRAWN	02/12/19 I. YAMASAKI		TITLE	IC-115
CHECKED	02/12/20 Y. KIMURA			
APPROVED	y. Kimura	Nera C		
SCALE	02/12/20	MASS	NAME	ANTENNA UNIT
DWG. No.	C5635-K04-B			SCHEMATIC DIAGRAM



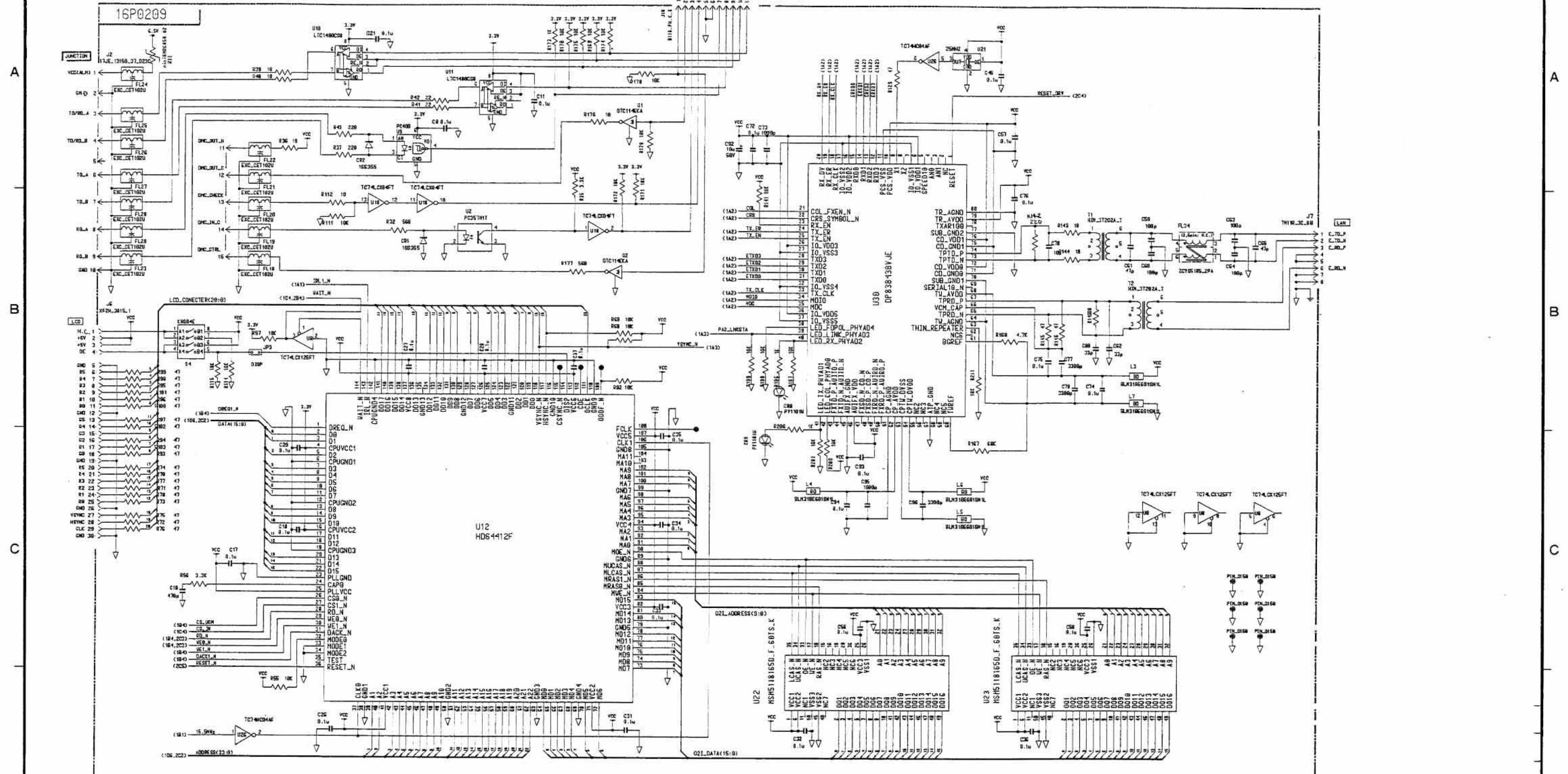
DRAWN 02/09/21 T. YAMASAKI	TYPE 16P0207	
CHECKED 02/09/21 Y.K.I.		
APPROVED 02/09/21 Y.K.I.	1C-115	1B 03
SCALE MASS	MODEL	BLOCK No.
Dwg No. C5635-K05- A	16-001-3196-0	NAME ANT_RF PCB
SCHEMATIC DIAGRAM		







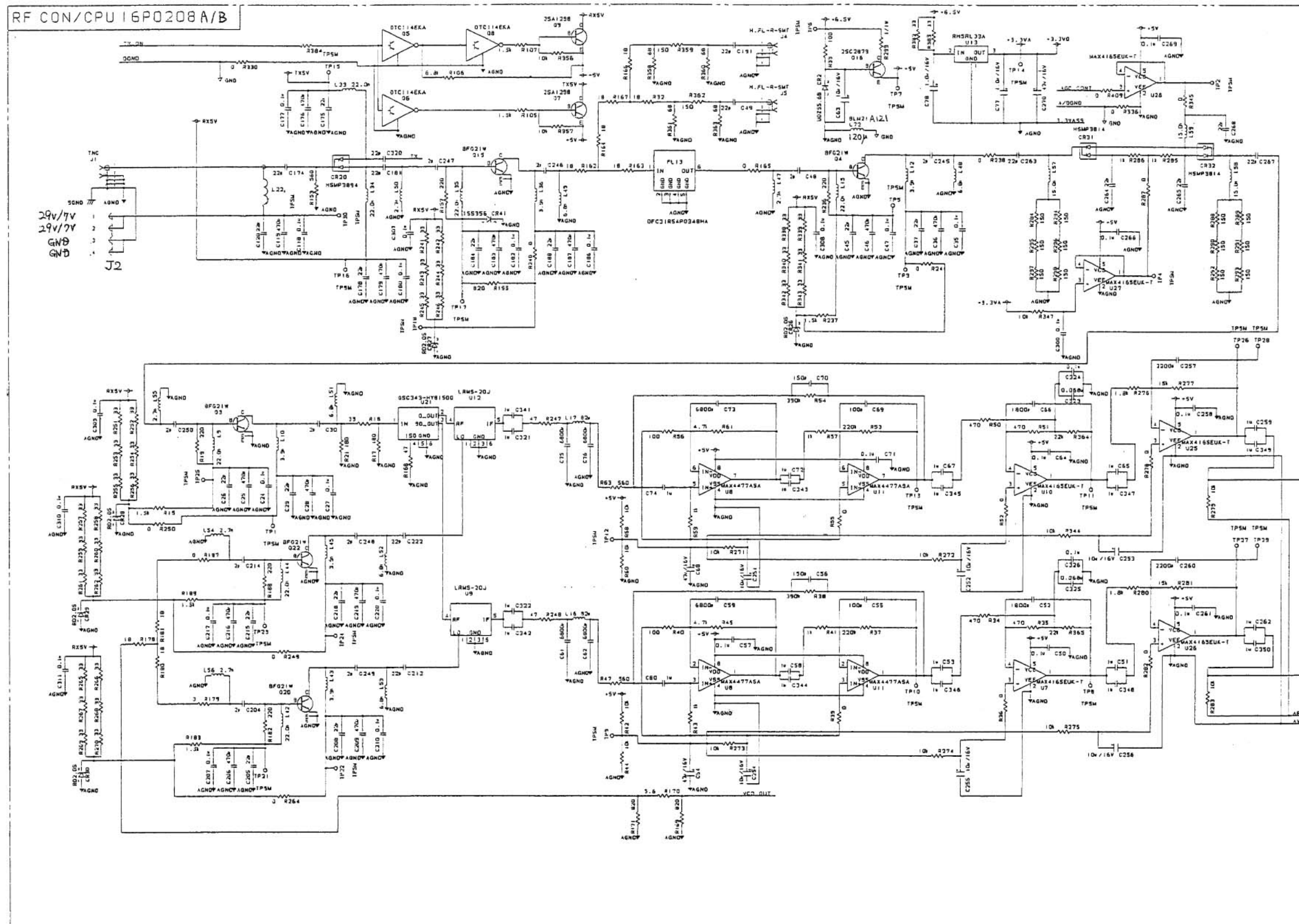
DRAWN 02/10/17 T. YAMASAKI	TYPE 16P0209 (2/3)
CHECKED 02/10/17 Y. K.	
APPROVED 02/10/17 Y. K.	IC-215
SCALE MASS	MODEL
Dwg No. C5635-K08- A	BLOCK No. NAME
16-001-3198-0	TERM CPU PCB
	SCHEMATIC DIAGRAM



DRAWN 02/10/17 T. YAMASAKI	TYPE 16P0209 (3/3)
CHECKED 02/10/17 Y.K.	
APPROVED 02/10/17 Y.K.	
SCALE MASS	MODEL BLOCK No.
Dwg No. C5635-K09- A	16-001-3198-1
	NAME TERM CPU PCB
	SCHEMATIC DIAGRAM

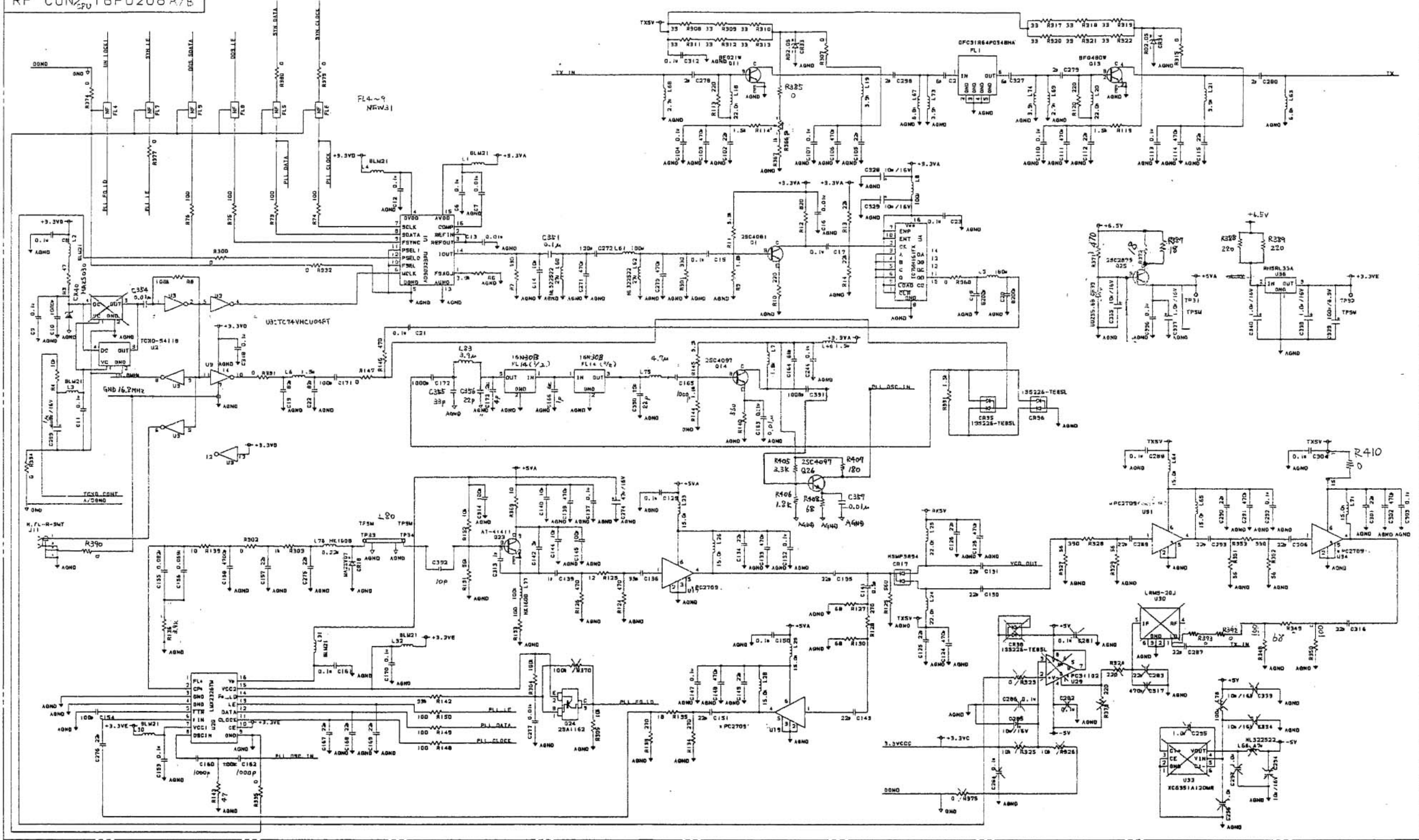


DRAWN 02/10/17 T. YAMASAKI		TYPE 16P0208A/B (1/3)	
CHECKED 02/10/17 Y.K.			
APPROVED 02/10/17 Y.K.		IC-215/216	
SCALE	MASS	MODEL	BLOCK No. NAME RF CON/CPU PCB
Dwg No. C5635-K10- A		16-001-3197-3 SCHEMATIC DIAGRAM	

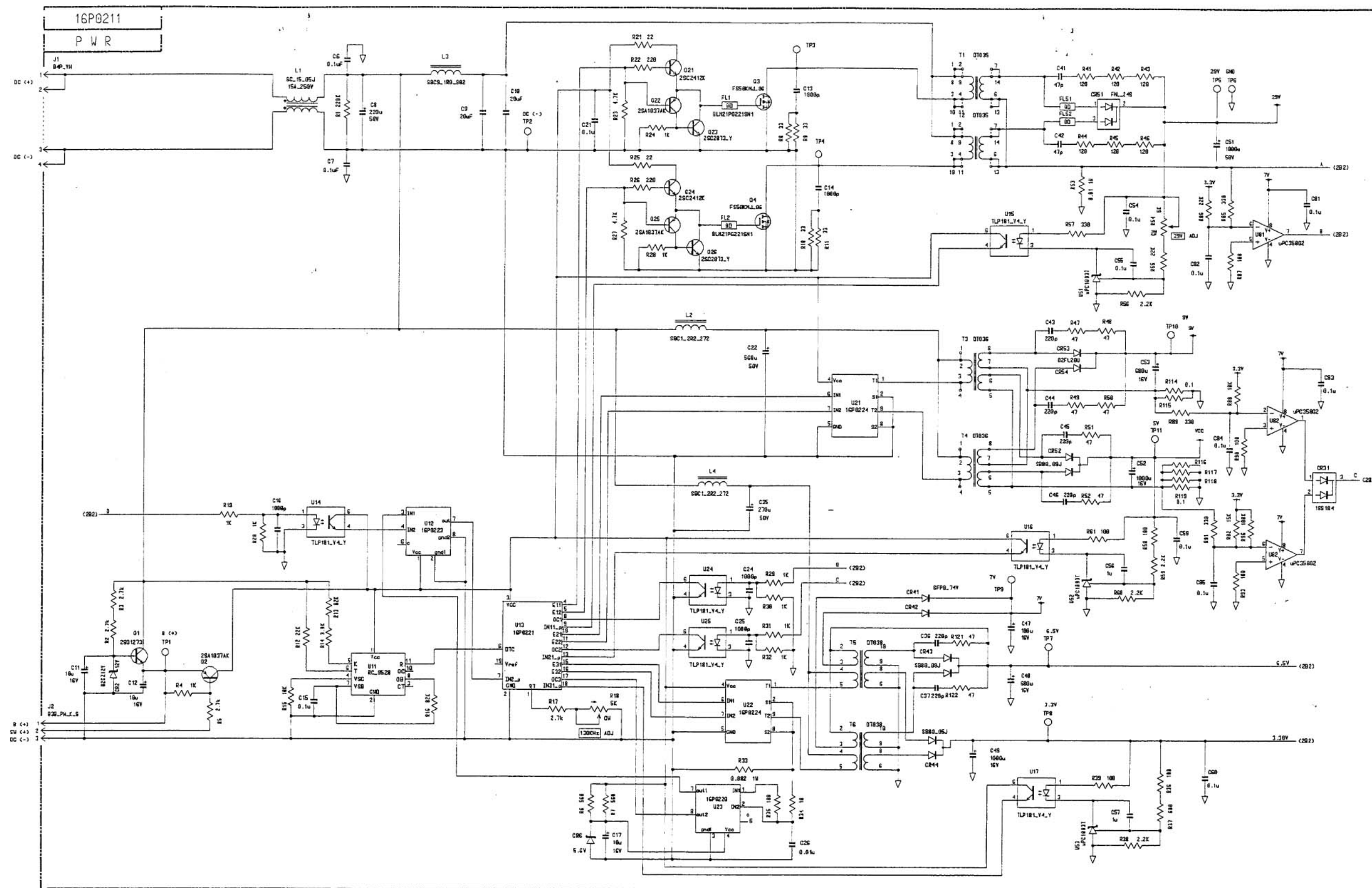


DRAWN 02/10/17 T. YAMASAKI	TYPE 16P0208A/B (2/3)
CHECKED 02/10/17 Y. K.	
APPROVED 02/10/17 Y. K.	
SCALE MASS	MODEL BLOCK No.
Dwg No. C5635-K11- A	NAME RF CON/CPU PCB
16-001-3197-3	SCHEMATIC DIAGRAM

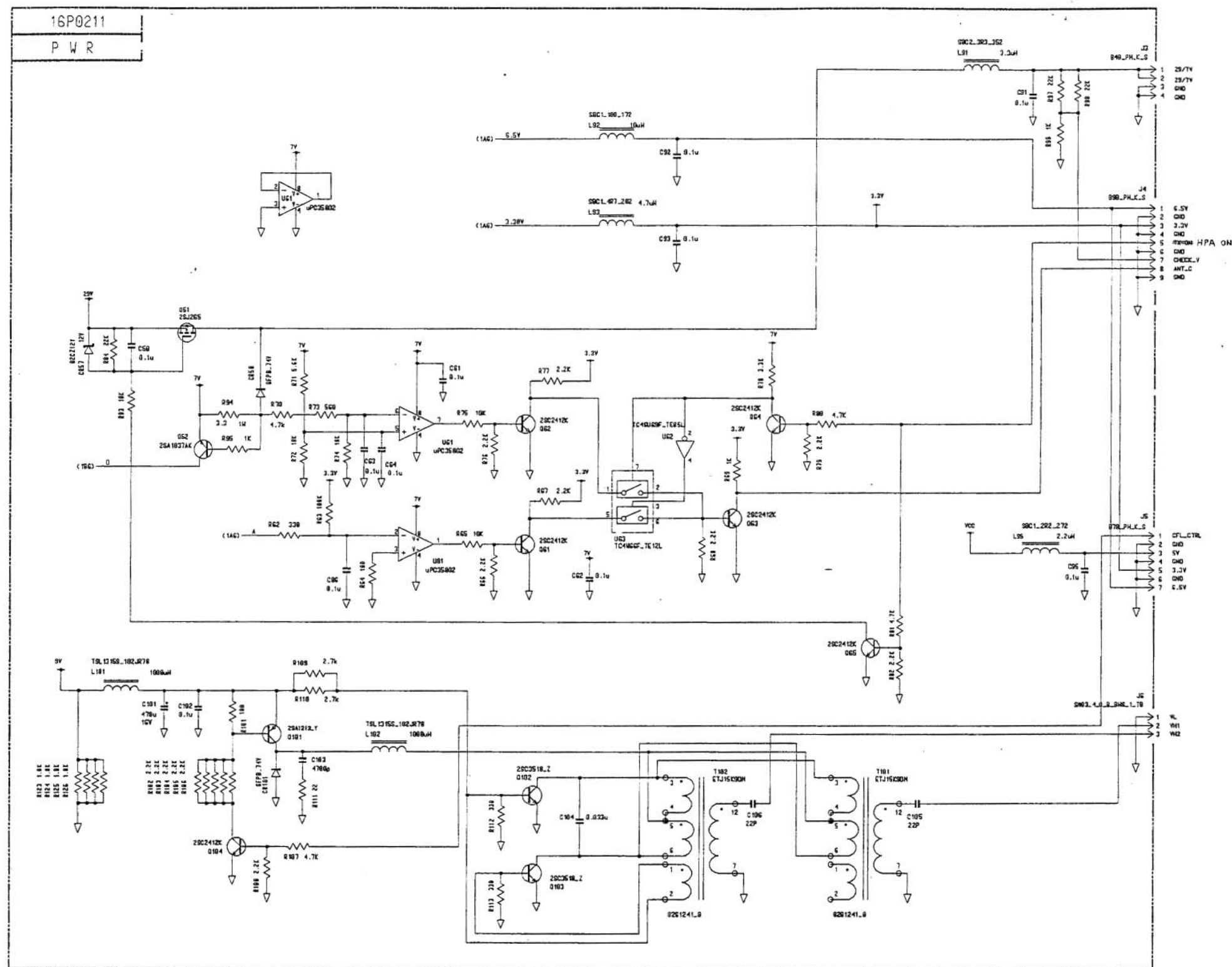
RF CON/CPU 16P0208A/B



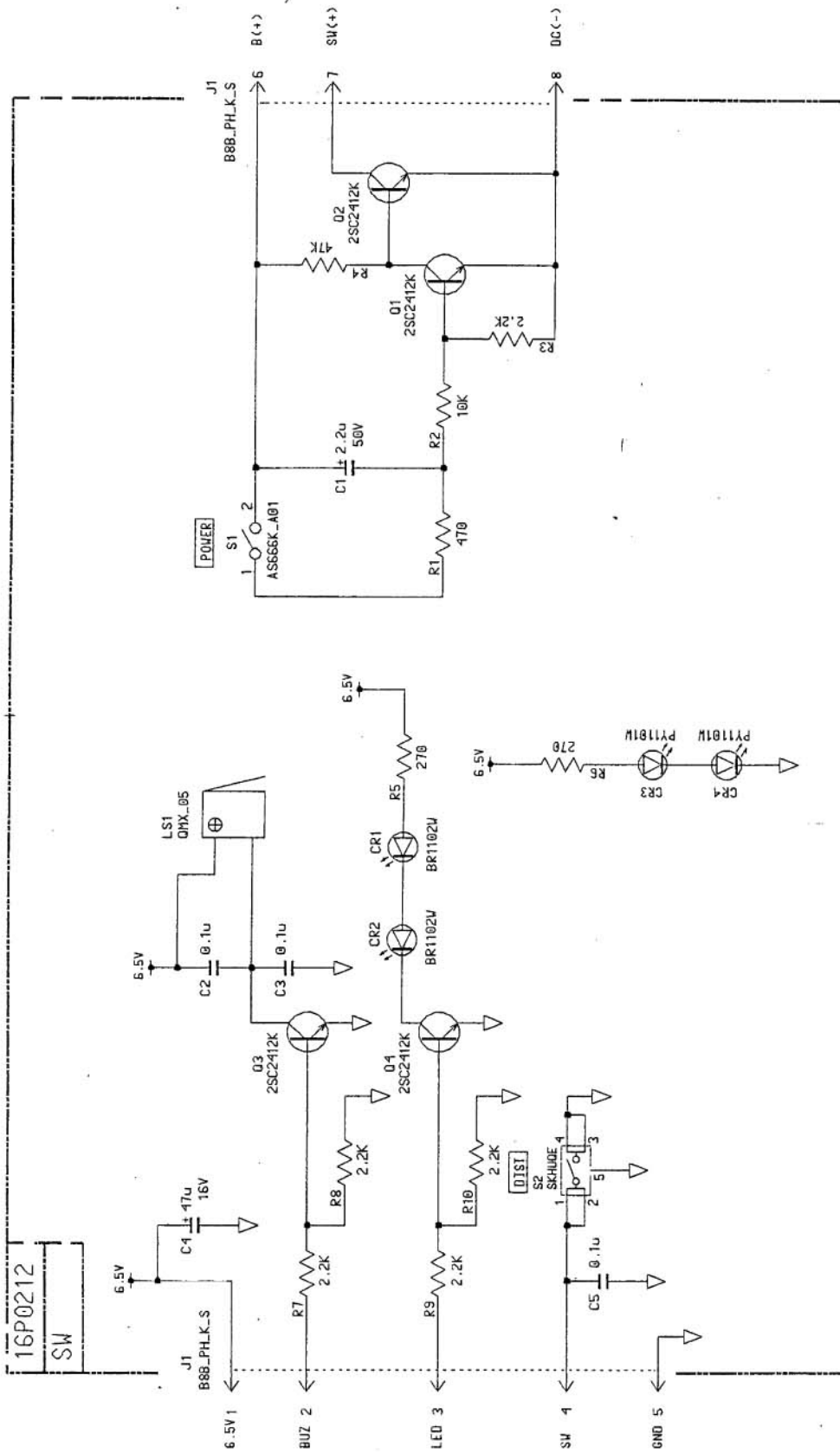
DRAWN 02/10/17 T. YAMASAKI	TYPE 16P0208A/B (3/3)
CHECKED 02/10/17 Y.K.	
APPROVED 02/10/17 Y.K.	1C-215/216
SCALE MASS	MODEL BLOCK No.
Dwg No. C5635-K12- A	16-001-3197-3
	NAME RF CON/CPU PCB
	SCHEMATIC DIAGRAM



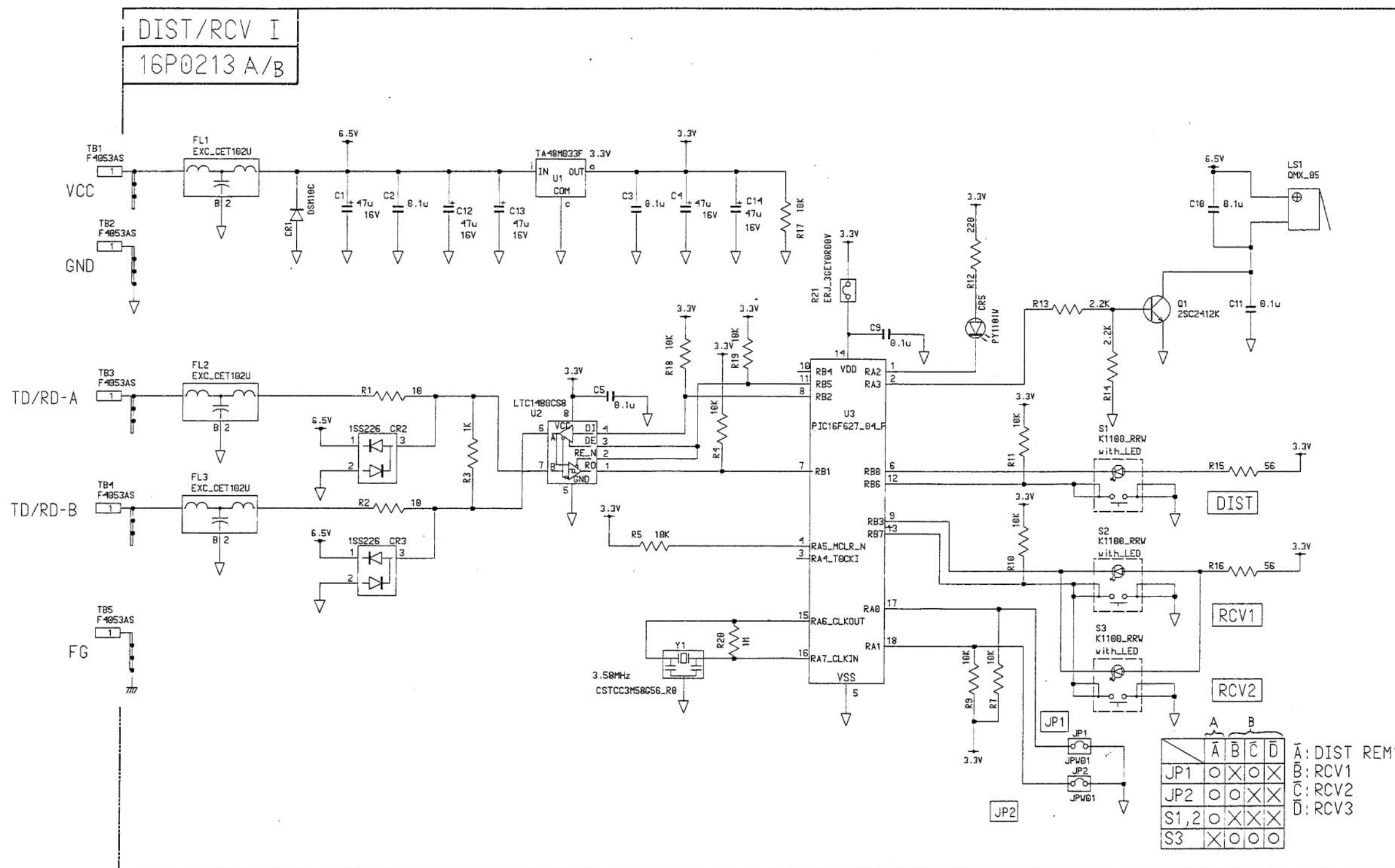
DRAWN 02/09/21 T. YAMASAKI	TYPE 16P0211 (1/2)
CHECKED 02/09/21 Y.K.	
APPROVED 02/09/21 Y.K.	
SCALE MASS	NAME PWR PCB
DWG No. C5635-K02- A	16-001-3199-0
	SCHEMATIC DIAGRAM



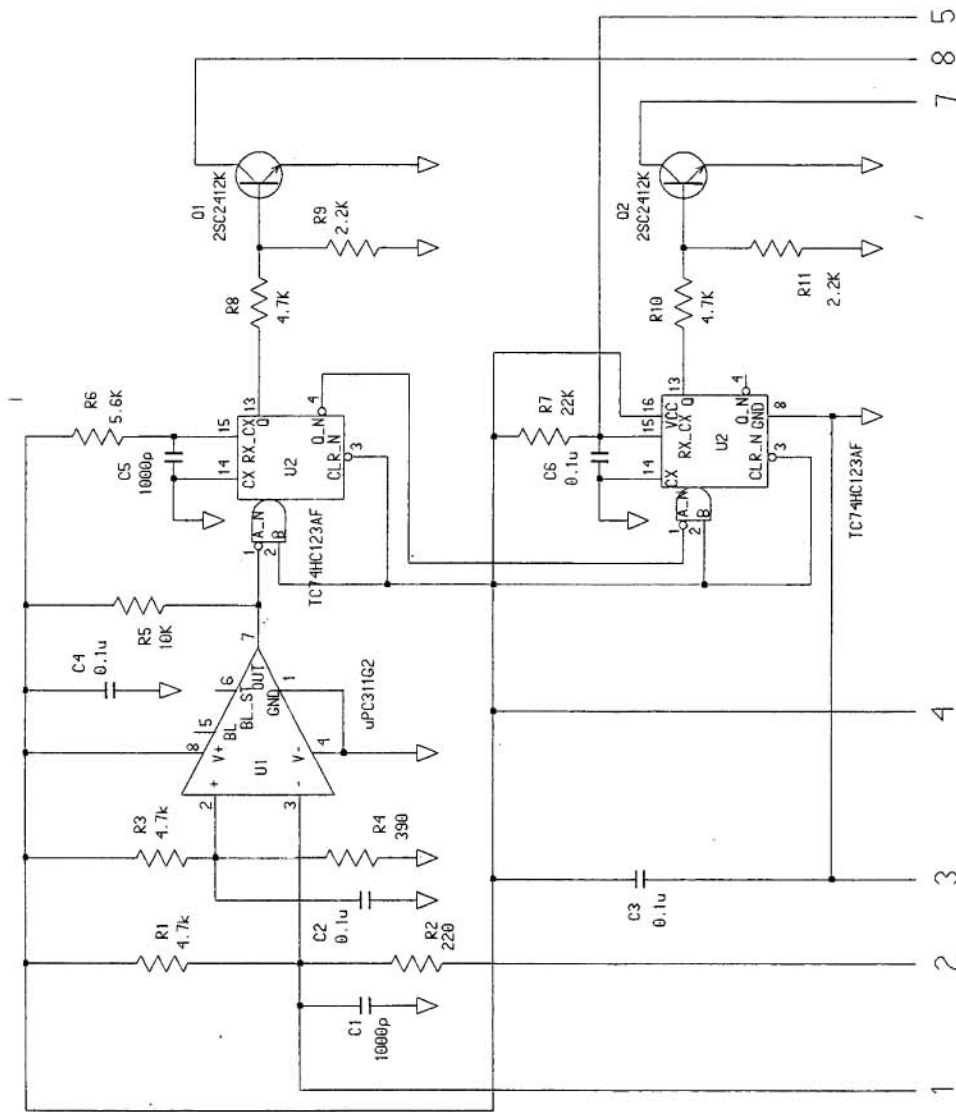
DRAWN 02/09/21 T. YAMASAKI	TYPE 16P0211 (2/2)
CHECKED 02/09/21 Y.K.	
APPROVED 02/09/21 Y.K.	
SCALE MASS	MODEL BLOCK No.
Dwg No. C5635-K03- A	NAME PWR PCB
16-001-3199-0	SCHEMATIC DIAGRAM



DRAWN 02/10/17 T. YAMASAKI	TYPE 16P0212
CHECKED 02/10/17 Y. Kline	
APPROVED 02/10/17 Y. Kline	
SCALE MASS	NAME SW PCB
Dwg No. C5635-K13- A	BLOCK No.
	MODEL IC-215
	16-001-3200-0
	SCHEMATIC DIAGRAM



DRAWN 02/09/21 T. YAMASAKI	TYPE 16P0213 A/B
CHECKED 02/09/20 Y.K.	
APPROVED 02/09/20 Y.K.	IC-305/306
SCALE MASS	MODEL BLOCK No.
Dwg No. C5635-K06- A	NAME DIST/RCV PCB
16-001-3202-0	SCHEMATIC DIAGRAM



DRAWN
02/10/17 T. YAMASAKI

CHECKED
02/10/17 Y. K. K.

APPROVED
02/10/17 Y. K. K.

SCALE
MASS

Dwg No. C5635-K14- A

TYPE

16P0220

NAME

PWR HIC PCB

BLOCK No.

IC-215/216

MODEL

16-001-3212-0

SCHEMATIC DIAGRAM



3

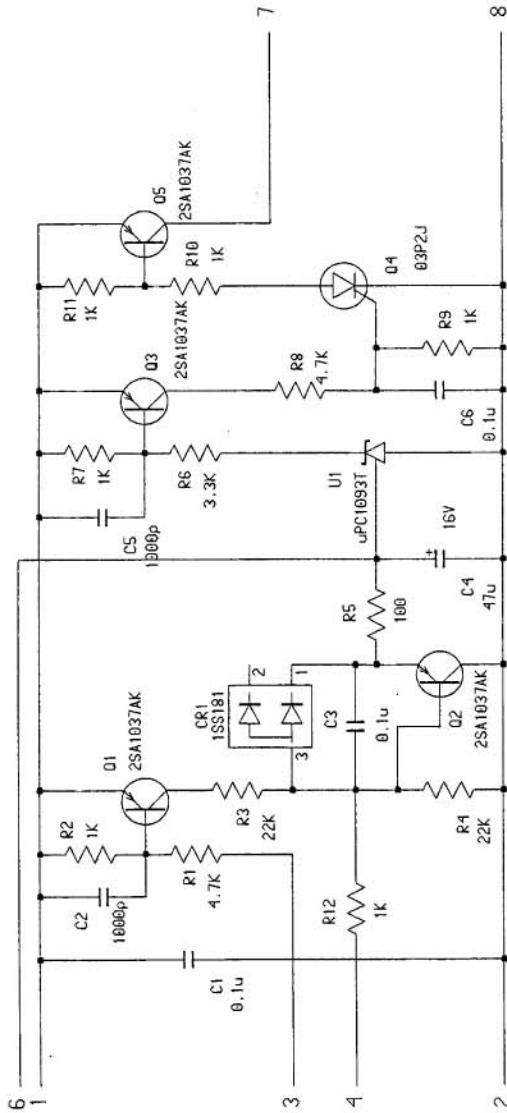
C

PWR HIC PCB

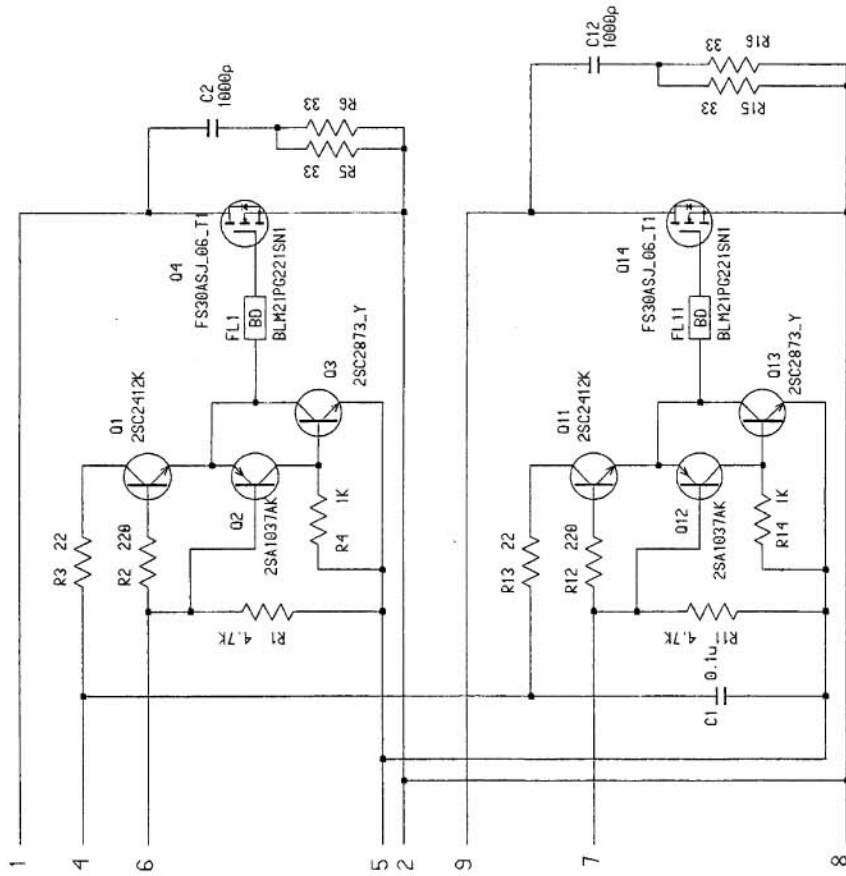
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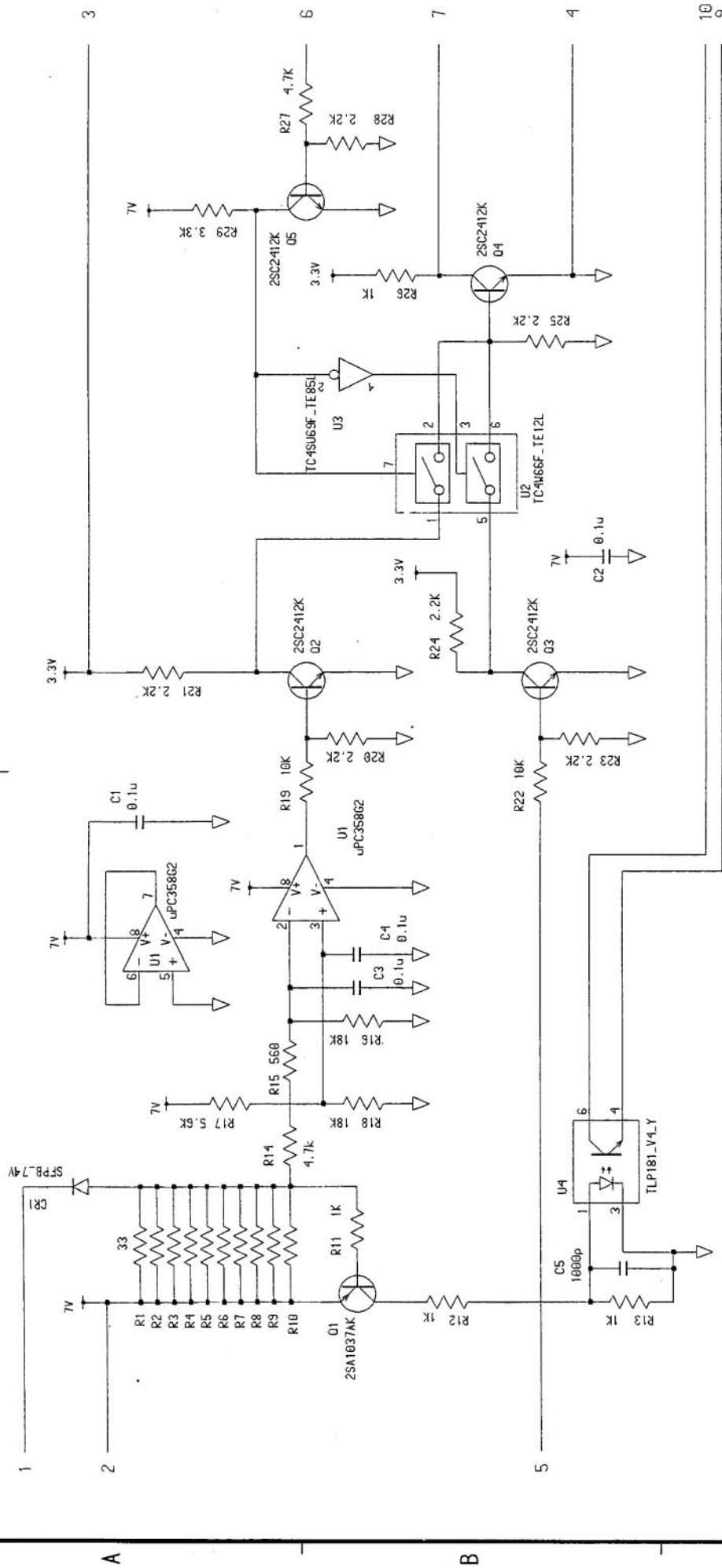
SCHEMATIC DIAGRAM



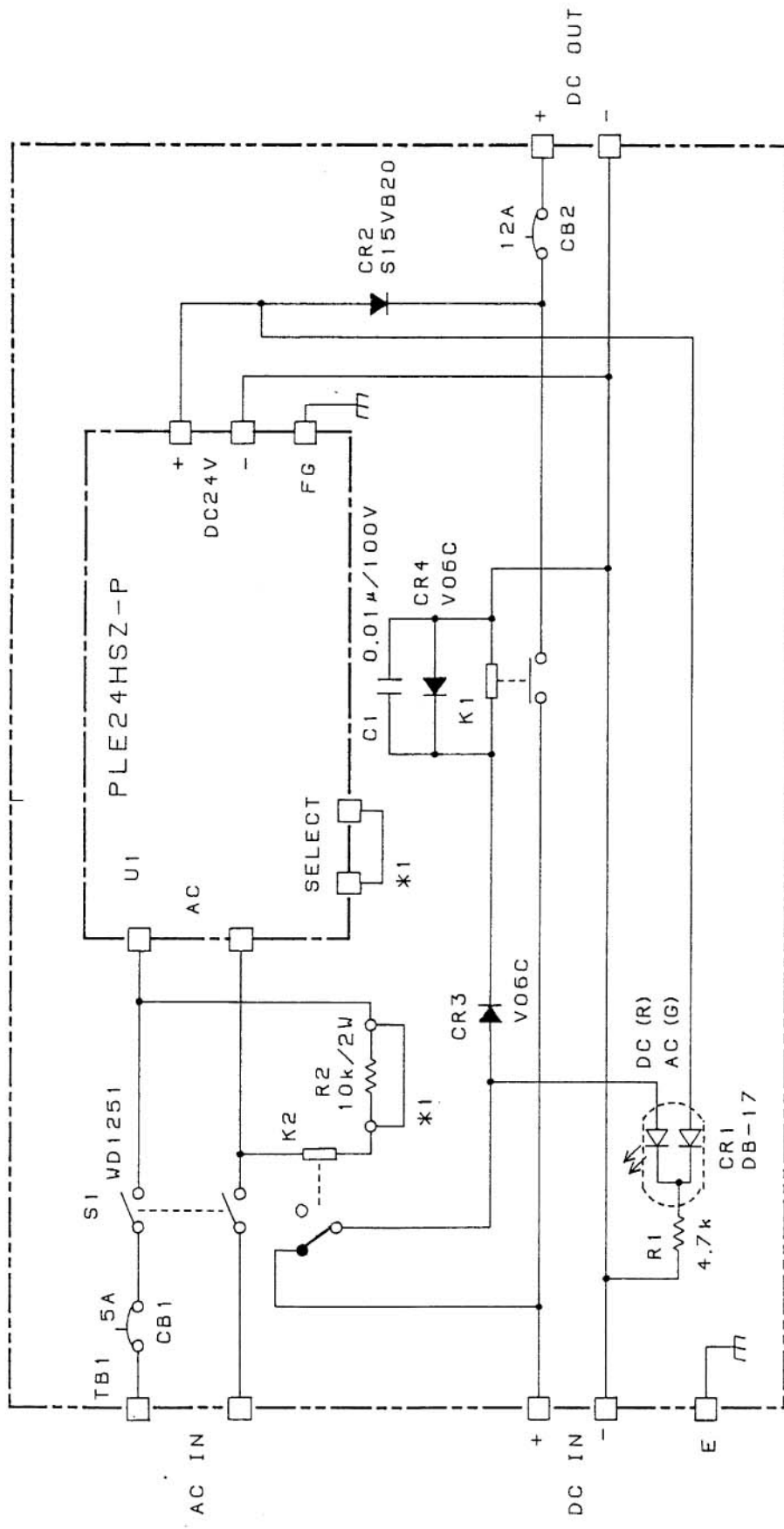
DRAWN 02/10/17 T. YAMASAKI	TYPE 16P0223
CHECKED 02/10/17 Y.K.	
APPROVED 02/10/17 Y.K.	
SCALE MASS	MODEL IC-215/216
Dwg No. C5635-K17- A	BLOCK No.
	NAME PWR HIC PCB
	SCHEMATIC DIAGRAM



DRAWN 02/10/17 T. YAMASAKI	TYPE 16P0224
CHECKED 02/01/17 Y.K.	
APPROVED 02/01/17 Y.K.	
SCALE MASS	BLOCK No. 10-215/216
Dwg No. C5635-K18- A	MODEL 16-001-3216-0
	NAME PWR HIC PCB
	SCHEMATIC DIAGRAM



DRAWN 02/10/17 T. YAMASAKI	TYPE 16P0225	
CHECKED 02/10/17 Y.K.		
APPROVED 02/10/17 Y.K.	MODEL IC-215/216	NAME PWR HIC PCB
SCALE MASS	BLOCK No.	
Dwg. No. C5635-K19-A	16-001-3217-0	SCHEMATIC DIAGRAM



*1 : AC100V(CLOSE)
AC200V(OPEN)

DRAWN	APR 18 '97	TYPE	PR-240
CHECKED	T. YAMASAKI		
APPROVED	APR 22 '97 K. Kusunoki		
SCALE	1/100	APPLICABLE TO;	
	kg	BLOCK NO.	
DWG NO.	C5003-K02-A	NAME	RECTIFIER
			SCHEMATIC DIAGRAM



DRAWN	02/06/24	T. YAMASAKI				
CHECKED		02/6/24 Y. K.				
APPROVED		02/6/24 Y. K.				
SCALE		MASS	PR-240	MODEL	BLOCK No.	NAME
						PLE PCB
						PLE PCB
						SCHEMATIC D
Dwg No.	C5003-K03- A					

Nera ASA

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